

HORTICULTURAL ABSTRACTS

Vol. XVII

December 1947

No. 4

Some progress has been made in the present number towards covering literature issued in the war, but only recently received.

Initialled reviews are by H. B. S. Montgomery and S. C. Pearce of the East Malling Research Station, J. Thorsrud attached East Malling Research Station, and G. St. C. Feilden.

INDEX OF CONTENTS.

		Nos.			Nos.
MISCELLANEOUS	Abstr. 45.	Noted 11	1862-1907k	SMALL FRUITS, VINES AND NUTS	
General	..	..	1862-1871	Abstr. 48.	Noted 11 2007-2055k
Meteorology and climate	..	..	1872-1875	PLANT PROTECTION OF DECIDUOUS FRUITS	
Growth and nutrition	..	..	1876-1894	Abstr. 173.	Noted 18 2056-2229r
Technique	..	..	1895-1906	VEGETABLES, TOBACCO AND OTHER CROPS	
Noted	..	..	1907a-1907k	Abstr. 204.	Noted 26 2230-2434z
TREE FRUITS, DECIDUOUS				FLORICULTURE	Abstr. 27. Noted 9 2435-2462i
Abstr. 98.	Noted 14	1908-2006n		CITRUS AND SUB-TROPICALS	
General	..	..	1908-1932	Abstr. 94.	Noted 16 2463-2557p
Breeding and varieties	..	..	1933-1948	TROPICAL CROPS	Abstr. 107. Noted 22 2558-2665v
Propagation and rootstocks	..	..	1949-1962	PACKING AND STORAGE	
Pollination	..	..	1963-1967	Abstr. 34.	Noted 3 2666-2700c
Growth	..	..	1968-1971	PROCESSING AND PLANT PRODUCTS	
Training, pruning and cultural treatment	..	..	1972-2005	Abstr. 59.	Noted 13 2701-2760m
Noted	..	..	2006a-2006n	NOTES ON BOOKS AND REPORTS	
				Abstr. 47.	Noted 5 2761-2808e
				Total Abstracts	936. Noted 148.

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

MISCELLANEOUS.

General.

1862. ASHBY, A. W. 63(42)
The future of British agriculture.
Westminster Bank Rev., May 1947, pp. 3-12.
 Most of this paper is concerned with a review of the general bases of agricultural prosperity, and an analysis of the effects of the second world war on British agriculture. We note that habits of higher consumption of vegetables and salads appear to be well established, and that public opinion and legislative trends appear to be more favourable to agriculture since 1932. Of the future, the author notes that much will depend on the purchase of food and foodstuffs from abroad. Agricultural prosperity depends on rising standards of productivity and a continued demand for food.
1863. GUYOT, H. 63(072)(42)
Organisation et orientation actuelles des recherches agronomiques en Grande-Bretagne.
(Organization and present direction of agricultural research in Great Britain.)
Fruits d'Outre-mer, 1947, No. 1, pp. 17-25.

After brief descriptions of eight research institutes in Britain, a note on the function of the Imperial Agricultural Bureaux, and a page on the distribution of research on soils and plant biology as between the different research establishments, the author arrives at the following conclusions. (1) Agricultural research can only bear fruit if it is carried out in powerfully organized and well-endowed institutes. (2) The recruitment of the staff for these institutes ought at the same time to be wide in so far as it concerns the scientific branches represented and very exacting in so far as it concerns the quality of the research workers. (3) The director of each institute ought to possess both scientific

and administrative qualities, the psychological factors assuming considerable importance because of the diversity of the staff and the breadth of the establishment. (4) An important factor for success is the collaboration of the different institutes.

1864. LEWICKI, S. 633/635(438)
Stan i możliwości odbudowy rolnictwa lubelskiego na tle ogólnopolskim. (Present state and possibilities of recovery of agriculture in Lublin county in view of the general Polish situation.)
Biblioteka Puławska, 1946, No. 21, pp. 143.

Information is given of the present position as regards a number of important crops. *Hops*. Before the war 70% of Polish production was exported. As the result of the war and subsequent mismanagement, hop cultivation is now at a very low level. Suggestions are made for reorganizing hop production. It will mean imports of material from Germany, the setting up of instructional centres for growers and instructors and of experimental stations where problems can be undertaken. *Tobacco*. Before the war Poland produced nearly enough tobacco for her own needs. In Lublin county in 1939, 6,000 plantations, covering 2,000 ha., produced 85% of the demand for Virginia tobacco, 25% of that for Mahorka and 5% of that for raw oriental sorts. Under the Germans the area was greatly increased, rising to 6,088 ha. At the present time there appears to be a somewhat difficult position as tobacco is now administered by the Ministry of Finance and Monopolies and not by that of Agriculture. Material for planting and processing is scarce and new planting does not pay. *Potatoes*. Varieties used before the war were largely German, yields reaching 139 quintals per ha. in Lublin county. Special measures are urged for the production of wart-immune and

wart-free strains, and regulations are necessary to ensure that diseased seed is not used. *Fruit trees*. Pre-war figures show that orchards covered some 38,000 ha. planted with 4½ million trees, of which 65% were apples, 7% pears, 15% cherries, 11% plums. In addition there were 20,000 m² under glasshouses and 300 ha. under nurseries. War losses amounted to 70% fruit trees, 75% nurseries and 50% of glasshouses and frames. It is proposed that three to six years' credit should be provided for establishing new nurseries and orchards. This would appear preferable to attempts to rebuild old orchards.

1865. POLLARD, A. G. 633/635

Agriculture and horticulture.

Appl. Chem. Reps., 1945, 30: 400-30, bibl. 190.

The discussion of the year's literature includes the following subjects: Evaluation of nutrient status of soils by plant analysis.—Orchard soils.—Light and plant growth.—Growth-promoting substances.

1866. SALISBURY, E. J. 58.006(42)

The Royal Botanic Gardens, Kew.

Endeavour, 1947, 6: 58-62.

The present director of Kew tells us shortly and succinctly much on the origin, the size, the content and purpose of these famous gardens. They now extend over some 300 acres and comprise more than 40,000 plant species, which are grouped both to please and to enlighten, and form a supplement to the Herbarium of more than 5 million species. Kew has been the source of many published Floras, while the *Kew Bulletin of Miscellaneous Information* records much of the more specialized research carried out there in taxonomy, morphology, anatomy, economic botany and botanical exploration. In the Jodrell Laboratory experimental work on plant anatomy and other subjects is carried on. Four museums of Economic Botany within the gardens house a large collection of plant products. Kew has played an important role in the distribution of economic plants throughout the Empire, notable instances being cocoa and oil palm to West Africa, pineapple to a number of places, tung to various Dominions and Colonies. Apart from this, Kew is not only a popular resort highly valued for its beauties, but also serves as an extremely well-equipped training ground for horticulturists.

1867. WYMAN, D. 58.006(7)

The arboretums and botanical gardens of North America.*

Chron. Bot., 1947, Vol. 10, No. 5/6, pp. 395-484, bibl. 96, \$1.50.

The author first discusses briefly the problems which beset the establishment of a botanical garden, dealing with questions of endowment, selection of site, planning, stimulation of interest, method of planting and what to plant, space required, costs, equipment, labour, labelling and mapping. This note is followed by information of 81 arboretums or botanical gardens in the U.S.A., 8 in Canada and 1 in Cuba, compiled from replies to a questionnaire issued recently by the American Association of Botanical Gardens and Arboretums. An attempt is made in each case to give an idea of the primary functions of the gardens, the type of plants collected and of any special features. For fuller reference, publications which deal with the work of each institute are listed at the foot of each account. This section is followed by 17 photographic reproductions of old prints of famous botanical gardens throughout the world. The short bibliography is of a general character and does not concern particular gardens, historical literature or collection of plants. Shorter lists are given (1) of proposed and (2) of defunct gardens. The reference value of the present volume is great. The editors hope to issue a companion volume on gardens outside America.

* Chronica Botanica Co., Waltham, Mass., and Wm. Dawson, London.

1868. ALEKSEEV, V. P. 58.006(47)

A general plan of reconstruction for the Batum botanical garden. [Russian.]

Sovetsk. Bot., 1946, 14: 372-4.

The garden is to be both instructive and decorative. One of the sections will demonstrate the principles of Darwinian evolution; the other 11 will represent the flora of each of the main geographical regions of the world.

1869. KOLESNIKOV, B. P. 633/635(47)

Work of the soil and botanical section of the Far Eastern Komarov Branch of the Academy of Sciences U.S.S.R. between 1944 and 1945. [Russian.]

Sovetsk. Bot., 1947, 15: 56-9.

The following are some of the main lines of investigation being pursued: the utilization of wild medicinal and other useful plants of the Maritime Province; studying the populations of wild fruit trees and shrubs of the Province; investigating the biological characters and distribution of *Schizandra chinensis* in the Far East of the Union; and classifying the *Agaricales* of the Far East, particular attention being given to edible mushrooms. These activities are only very briefly described.

1870. VYSOCKII, K., AND KULITIASOV, N.

633/635(47)

Kibrai. (The Kibrai establishment.) [Russian.]

Kolhoznoe Proizvodstvo (Collective Farming).

The Central Asiatic branch of the All-Union Institute of Plant Industry was founded 20 years ago at Kibrai, near Tashkent. The present article contains short notes on the various plants from Central Asia and elsewhere which have been utilized at Kibrai. Among such plants have been *Arachis* spp., *Hibiscus* spp., jute, *Ricinus* spp., tau saghyz, several grape varieties, and several other useful plants. These have been submitted to breeding and selection.

1871. COLEMAN, F. B. 631.531: 351.823.1(943)

Sale of seeds—regulatory legislation.

Qd agric. J., 1947, 6: 338-50.

Simple, clear notes on the definitions and standards stipulated in the Seed Acts and Regulations of Queensland.

Meteorology and climate.

1872. POULTER, R. M. 551.56: 621.396.97

Meteorological broadcasts.

Weather, 1947, 2: 14-5.

Weather forecasts are broadcast by wireless telephony hourly from 07.00 to 18.00 in winter and from 06.00 to 21.00 in summer (G.M.T.) on 1,224 metres (245 Kc/s) from Borough Hill, Northants, England, being introduced by the words "This is Airmet". Six ten-minute sections deal with (1) navigational and airfield reports, (2) general meteorological situation, expected developments and weather warnings, (3) detailed description of (2), (4) pressure, cloud, visibility and weather at 40 airfields in the British Isles, and Paris, Amsterdam and Brussels, (5) part (3) revised, and (6) part (4) revised.

1873. PENMAN, H. L. 551.5: 621.396.97

Future developments in agricultural meteorology.

Weather, 1947, 2: 137-41.

The writer discusses the physical, biological, and statistical problems involved. So far, crop forecasting has been disappointing but outbreaks of pests or diseases (e.g. potato blight) may sometimes be forecast from meteorological data. Attention is drawn to the "Airmet" Service, which is much more detailed than the B.B.C. weather forecasts.

1874. TYDEMAN, H. M., AND PRESTON, A. P. 634.1/7: 551.56

Weather conditions during 1946.

A.R. East Malling Res. Stat. for 1946, A30, pp. 74-6.

The weather at East Malling throughout 1946 was almost consistently unfavourable, particularly so for arable crops during harvesting. However, no damaging frost was recorded during the blossoming season, and ground frosts were few and late in the autumn. The meteorological observations during the year are summarized in a table, and a diagram shows the weather recorded during the blossoming season.

1875. ÅBERG, B. 581.035: 577.16
Effects of light and temperature on the ascorbic acid content of green plants.
Ann. agric. Coll. Sweden, 1946, 13: 239-73, bibl. 5 pp.

Tomato and kale plants have been grown under various conditions of light and temperature, mainly in artificially lighted control chambers, and the ascorbic acid content of the leaf blades determined. The chief results are as follows: 1. The rays of the blue-violet end of the spectrum have no specific or indispensable function in the synthesis of ascorbic acid. 2. In full-grown tomato leaves there is an approximate proportionality between light intensity and ascorbic acid content up to an intensity of ca. 80 mgcal/cm² min. in the range below 700 mμ. 3. At low light intensities there is a rapid decrease of the ascorbic acid content with increasing leaf age. 4. In darkened tomato plants the ascorbic acid content rapidly decreases. 5. The effect of increasing the photoperiod is comparable to that of increasing the light intensity, and is, therefore, thought to be essentially "photo-quantitative" in character. 6. The ascorbic acid content of tomato leaves was ca. 30% higher for plants cultivated at 15-5° C. than for those cultivated at 23-0° C. 7. It is suggested that there are two different modes of ascorbic acid production in plants: (a) a light-independent synthesis, prevailing in sprouting seeds, and (b) a light-conditioned synthesis, which is probably connected with the assimilation of carbon dioxide. 8. The factors regulating the ascorbic acid content of tomato fruits are discussed with regard to the present findings on synthesis and translocation. [From author's summary.]

Growth and nutrition.

1876. BERNARD, N. 581.144.2
Des orchidées à la pomme de terre. (Mycorrhizal associations in orchids and potatoes.)
Gallimard, Paris, 1943, reviewed in C.R. Acad. Agric. Fr., 1943, 29: 547-8 [received 1947].

A review of mycorrhizal associations, and their connexion with germination in orchids and tuber formation in the potato.

1877. HUNTER, A. S., AND KELLY, O. J. 581.144.2
The extension of plant roots into dry soil.
Plant Physiol., 1946, 21: 445-51, bibl. 8.

The roots of maize plants penetrated tar-paraffin [wax] pots and grew in "dry" [air-dried] soil; in the conditions of the experiment, they did not take up radioactive phosphorus from this soil.—Salinas, Calif.

1878. PUCHER, G. W., AND OTHERS. 587.15: 581.192
Studies in the metabolism of crassulacean plants: (1) changes in the composition of *Bryophyllum calycinum* during growth; (2) the effect upon the composition of *Bryophyllum calycinum* of the form in which the nitrogen is supplied.
Plant Physiol., 1947, 22: 1-19, bibl. 17, and 205-7, bibl. 17.

1. The growth of the plant was studied by analyses of leaf

and stem tissue over three months. By comparison with similar data for tobacco, *bryophyllum* grows less rapidly; but citric acid is formed at almost equal rates, and isocitric acid is formed almost as rapidly by *bryophyllum* as malic acid is by tobacco. *Bryophyllum* is a potential source of isocitric acid; the older plants also contained "sedo-heptose", a sugar whose reducing power is reduced by boiling with acid. 2. Culture solutions were arranged to provide a constant concentration of N with proportions of nitrate and ammonium ions from all nitrate to all ammonium. *B. calycinum* follows the general rule that organic acidity of tissue is diminished by culture on ammonium ion as the source of nitrogen. The change falls upon both malic and isocitric acids and affects the quantity of each of these substances present in the leaves equally. Citric acid is affected to a smaller extent with respect to quantity, but the proportional change is even greater. [From authors' summary.]—Conn. agric. Exp. Stat.

1879. MOLOTKOVSKIĖ, G. H. 631.541
Changes in the tropism of plants under the influence of grafting. [Russian.]
Agrobiologija (Agrobiology), 1946, No. 2, pp. 131-4.

During experiments in grafting *Physalis transchettii* on *P. aequata*, *P. peruviana*, *Solanum acaule*, and *S. demissum*, and the potato variety, Smyslovskii [Fürstenkrone] on *Sarracha jatamata*, it was observed that the behaviour of the scion became abnormal. The axillary shoots of *P. transchettii*, for example, grew downwards and in time produced axillary shoots of their own capable of striking root if brought in contact with the soil. This rooting caused the tips of the other down-growing shoots, and of shoots developed subsequent to the rooting, to grow upwards, a nutrient deficiency resulting from the interruption of contact between the scion and the soil having been made good by the new roots. Down-growing shoots could not be induced to flower even by means of Cailahjan's method [using hormones?]. The reactions of the other scions are described and discussed.

1880. BEATTY, A. V. 581.12
Respiration and cell division in plants. I. Oxygen consumption and cell division in the leaves of *Ligustrum lucidum* and *Hedera helix*.
Amer. J. Bot., 1946, 33: 145-8, bibl. 23.

From dusk to dawn oxygen consumption was correlated with mitotic activity.—Univ. Alabama.

1881. AUDUS, L. J., AND QUASTEL, J. H. 631.531.17
Selective toxic action of thiosulphate on plants.
Nature, 1947, 160: 263-4, bibl. 2.

Low concentrations of sodium thiosulphate selectively inhibited growth and germination of various cultivated plants.—University College, Cardiff.

1882. AUDUS, L. J., AND QUASTEL, J. H. 631.531.17
Toxic effects of amino-acids and amines on seedling growth.
Nature, 1947, 160: 222-3, bibl. 5.

Many amino-acids and amines are toxic to, or inhibit the growth of, roots of cress seedlings. Many of these substances are normal plant metabolites connected with the nitrogen nutrition of the plant.—University College, Cardiff.

1883. SWARBRICK, T. 577.17: 634/635
Growth regulating substances in horticulture.
J. roy. hort. Soc., 1947, 72: 313-27, 342-59, bibl. 47.

In delivering the Masters Memorial lectures the author deals with the applications of most interest to the horticulturist—the production of seedless fruits, the control of fruit fall, the stimulation and inhibition of root growth, formative effects and weed control, the stimulation and

inhibition of bud development, and the control of fruit ripening. His purpose has been to survey a wide field of research and to indicate future possibilities, while stressing the practical limitations of these substances to-day.

1884. RIERA, F. J. 577.17
Contribución al estudio de las fitohormonas. Enraizamiento forzado—Estimulación de crecimiento. (A study of plant hormones. Induced rooting-growth stimulation.) *An. Esc. Peritos agric. Barcelona*, 1944, 4: 113-53, bibl. 21 [received 1947].

A historical survey of the discovery and application of growth-promoting substances in general, with particular reference to their root-inducing properties, is followed by an account of trials by the author with cuttings of various woodland and fruit trees, including certain East Malling rootstock varieties of apple and quince. The tabulated results show in general that increased rooting followed the treatments (indoleacetic acid and a proprietary preparation Belvitan).

1885. CHAMINADE, R., AND BOUCHER, J. 577.17: 631.535
Recherches sur la présence de substances rhizogènes dans certains milieux naturels. (Root promoting substances in certain natural products.) *C.R. Acad. Agric. Fr.*, 1940, 26: 66-76 [received 1947].

Various substances were tested for their effect on rooting in geranium cuttings. Indol- β -acetic acid and indol- β -butyric acid induced callus formation, but the root systems of the treated cuttings did not develop any better than those of the control plants (treated with water only). Extracts of garden and moorland soils, leaf mould and stable manure had no appreciable effect on rooting. Peat extract improved root development without hastening it. Extracts from ivy accelerated and increased root development.

1886. WURGLER, W. 577.17
La croissance de la plante et les phytohormones. (Growth substances and plant growth.) *Rev. hort. suisse*, 1947, 20: 145-9.

The action of growth substances so depends upon their concentration and the way in which they are applied that they should not be used indiscriminately.

1887. DE ROPP, R. S. 632.314: 577.17
The growth-promoting and tumefacient factors of bacteria-free crown-gall tissue. *Amer. J. Bot.*, 1947, 34: 248-61, bibl. 31.

Continuing earlier studies [see *H.A.*, 17: 1151] by means of cultures *in vitro*, the author obtained evidence that root-producing substances are generated by tumour tissue, not by the bacteria causing the tumour; the substances diffuse in the plant beyond the tumour, and can stimulate self-limiting proliferation in normal excised callus tissue. *In vitro* grafts of tumour tissue induced proliferation in healthy tissue; in sunflower the outgrowths were well differentiated, but in periwinkle only scattered pockets of xylem were produced. It is concluded that a tumefacient agent is present in bacteria-free crown gall tissue, and the author discusses its possible nature.

1888. FULTS, J. L., AND PAYNE, M. G. 577.17: 632.954
A biometric evaluation of the growth-regulating and herbicidal properties of some organic compounds. *J. Amer. Soc. Agron.*, 1947, 39: 667-81, bibl. 3, being *Sci. Ser. Pap. Colo agric. Exp. Stat.* 243.

The growth-regulating properties of 74 chemicals were compared by a modified pea test, at 13 concentrations advancing in geometrical progression from 0.000029 molar to 0.122 m., using 2,4-D as control. The herbicidal action of 26 of these chemicals was compared, with the same

control, at 7 alternate concentrations, using castor bean seedlings in a test here described. The authors emphasize the need for making comparisons over a wide range of concentrations, and stress the value of basing these on the molecular weight of each compound.

1889. VAN OVERBEEK, J., GORDON, S. A., AND GREGORY, L. E. 631.535.4
An analysis of the function of the leaf process of root formation in cuttings. *Amer. J. Bot.*, 1946, 33: 100-7, bibl. 22.

Leafless cuttings of red hibiscus can produce roots if they are soaked in sucrose (4%) and ammonium sulphate (0.1 to 0.5%), followed by a dip in an alcoholic solution of indolebutyric acid (2 mg/cc.). It is concluded that the leaves, ordinarily essential to the rooting of such cuttings, do not produce the hypothetical hormone "rhizocaline". Analyses show that sucrose and nitrogenous substances are actually contributed to the cuttings by the leaves. In this material roots were initiated in the secondary phloem in the ray parenchyma. [See also *H.A.*, 15: 1441.—Institute of Tropical Agriculture, Mayaguez, Puerto Rico.

1890. RAKITIN, JU. V. 634.3: 581.144.4: 577.17
The fall of leaves under the influence of ethylene, and its relation to the distribution of plant hormones of the bios group. [Russian.] *J. Bot. U.R.S.S.*, 1946, 31: 2: 11-16.

The hormone first appears in the leaf blade and then, after being converted to a free state, travels down to the petiole where it brings about tissue changes resulting in the fall of the leaf. This process takes place naturally in autumn, but was prematurely initiated by the action of ethylene in specimens of cultivated lemon, *Poncirus trifoliata*, and grapefruit.

1891. CHAPMAN, H. D. 631.8
Mineral nutrition of plants. *Ann. Rev. Biochem.*, 1945, 24: 709-32, bibl. 82.

The review of the literature includes a discussion of: salt tolerance of plants, nutrition in relation to fruitfulness and fruit quality, and tissue testing for the diagnosis of nutrient status.

1892. BARBIER, G., AND COLE, Y. 631.8
Contribution à l'étude du mécanisme de l'absorption des substances minérales par la plante. (The mechanism of the absorption of mineral substances by the plant.) *C.R. Acad. Agric. Fr.*, 1941, 27: 729-37 [received 1947].

Experiments were carried out with peas grown in sand cultures which had wide variations in the K/Ca relation. It was found that there was a lowering in the yield only when there was considerable disproportion in the amounts of the two elements. The addition of large amounts of salts of calcium in a medium deficient in K aggravated the depressing effect produced by a deficiency of this element. In such a case, to re-establish nutrient equilibrium it was sufficient to add a relatively small amount of the deficient element, which is absorbed electively by the plant and exercises a strong antagonistic action with regard to the absorption of the other element.

1893. BERTRAND, G., AND SILBERSTEIN, L. 581.192: 547.26
Sur la répartition du bore parmi les espèces végétales. (The distribution of boron among plant species.) *C.R. Acad. Agric. Fr.*, 1941, 27: 24-6 [received 1947].

Although there is no definite demarcation with regard to boron content it appears that the monocotyledons generally contain less than the dicotyledons, the proportions being 2.3 to 11 mg. as against 8 to 95 mg. per kilo of dry matter.

Moreover, among the monocotyledons the large family *Gramineae* is clearly the poorest with only 2.3 to 5 mg. per kilo. The dicotyledonous families *Leguminosae* and *Cruciferae* comprise relatively many species among those most rich in boron.

1894. SMITH, F. B., AND THORNTON, G. D. 631.874.
Production of artificial manure.
Bull. Fla agric. Exp. Stat. 415, 1945, pp. 20
[received 1947].

Water hyacinth* [*Eichhornia crassipes*] was shown to be an excellent compost material, which was further improved by the addition of a chemical reagent (details specified). Pine needles, Spanish moss and moss gin waste proved unsatisfactory.

Technique.

1895. LORD, E. 519: 63
The use of range in place of standard deviation in the *t*-test.
Biometrika, 1947, 34: 41-67, bibl. 12.

The author proposes a rapid *u*-test for small samples in which the *s* of "Student's" *t*-test is replaced by an estimate of *σ* based on the range. Tables are given covering probability levels from 0.1% to 10%. In five examples the results of *t*-test and *u*-test are in agreement.

1896. LEFÈVRE, J. 576.312.35 + 612.014.44
Observations sur des applications de données biologiques récentes (polypléidie expérimentale-photopériodisme) à l'amélioration des plantes cultivées. (Polypléid and experimental photoperiodism for improving cultivated plants.)
C.R. Acad. Agric. Fr., 1940, 26: 788-92 [received 1947].

The author reviews progress in the study of polypléid for raising new plant forms, and of substances that have been used for inducing this condition. The article ends with a brief note in which he records having obtained ripe seeds of the Jerusalem artichoke [*Helianthus tuberosus*] by applying a "short day" treatment to the young plants.

1897. BRANDON, D. 631.544: 631.588.1: 634/635
Artificial illumination in horticulture.
Tech. Rep. British Electrical and Allied Industries Res. Ass. Ref. W/T11, 1946, pp. 17, bibl. 175, 48.

In this important critical survey the writer has analysed the results reported by workers in various countries and she points out that the frequent lack of full details of the lamps used makes it difficult to reconcile some of the experimental records. Of the physiological processes for which light is essential, phototropism is perhaps the least important; the source of light should be overhead. The relation of light to photosynthesis has been studied extensively, and it has been established that its nature depends upon temperature and species; red light is most effective, blue less so, while infra-red and the shorter ultra-violet rays are harmful to plant life. Photoperiodism has been studied even more extensively, and its horticultural applications are here indicated in a remarkably concise manner; flowers have been forced commercially for some time in the United States by photoperiodic means [see *H.A.*, 15: 363], and it is likely that strawberries would repay forcing in this country [see *H.A.*, 7: 306]. The extension of the practical application of artificial illumination in horticulture depends on increased physiological research into the induction of flower primordia and into photoperiodic after-effect on the one hand, and on the other on the further development of more efficient light sources, fluorescent lamps inherently more efficient than the incandescent types—though the latter may have advantages, e.g. in hot beds, by virtue of the heat they produce.

* See also *Indian Farming*, 1947, 8: 29-30.

Experimental plant houses have been built without glass, and if artificial light can be provided economically, such a house may prove of commercial value; compared with a glasshouse of similar capacity, its first cost would be lower and the cost of artificial heat could be greatly reduced by insulation. The writer outlines a research programme designed to ascertain the best colour of light, sequence of photoperiods, and intensity of light both for photoperiodic control (40 foot candles is generally recommended) and for efficient photosynthesis (250 to 1,000 foot candles), in the cultivation of tomatoes, lettuce, cucumbers, and various flowers.

It is concluded that the results of two years' experimental work would settle present differences and permit the commercial development of an efficient plant irradiator. [Those who have struggled to grow plants out of their natural habitat would certainly welcome such an aid.]

1898. CAMERON-BROWN, C. A. 631.588.1: 634/635
Electricity in the garden.
J. roy. hort. Soc., 1947, 72: 274-81.

A summary of applications available at present. *Soil warming*: current practice is to lay bare galvanized or alloy wires 4 to 12 in. apart, 6 in. deep, heating these at a loading of 2 to 5 watts per sq. ft. at low voltage (6) through a transformer. For *hot beds* a daily "dose" of 40 watt-hours is needed in England (50 in Scotland), costing about 1d. at 1d. per kwh. *Cloches and propagating beds* may need 50% longer daily heating. It is very much more economical to heat only the propagating bench, or a bed, in a greenhouse than to heat the whole house. *Greenhouse*: a small greenhouse should be fitted with rustproof tubular heaters below the benches controlled by a waterproof thermostat; reasonable temperatures can be attained fairly cheaply. *Sterilization of soil* can be effected by passing a current through it. *Lawn-mowers and hedge-trimmers*, whose blades are driven by electricity, are available; electric pumps may be used for moving water. In the U.K. present fuel restrictions limit heating to certain vegetables.—Kew.

1899. SKILLMAN, E. 631.67
Irrigation.
Bull. Minist. Agric. Lond. 138, 1947, pp. 47, bibl. 56, 1s. 6d.

The greater part of this bulletin is taken up with a study of the ways and means of getting water from one source or another and distributing it so as to supplement the somewhat erratic summer rainfall of England. Practical systems are illustrated and tables provide much information about water and its behaviour in pipes. The bulletin is sub-titled "with notes on crops to which it is applicable", and crops mentioned include cauliflowers, celery, chrysanthemums, mint, narcissi, early potatoes, radish, rhubarb, onions, spinach, sprouts, turnips and young plants of broccoli, cabbage and lettuce. Strawberries, too, respond well to irrigation, and top fruit may benefit in dry years. With regard to soils, the author urges that the manure cart and the irrigation system should be worked in close conjunction.

1900. SPENCER, E. L. 631.67
Vertical movement of salts in soils as affected by irrigation practices.
Proc. Fla. St. hort. Soc., 1945, pp. 246-9.

A preliminary report which shows that there is in the soil a vertical movement of salts when dissolved in irrigation water.

1901. MILES, R. O. 631.589: 663.61
The culture of plants in sand and in aggregates.
Bull. Jealott's Hill Res. Stat. 2 (revised), 1947, pp. 52, bibl. 23.

Bulletin No. 2 [see *H.A.*, 11: 672] is here revised, with the title changed to mark the exclusion of solution culture. Cultural details and cropping results are reported for tomatoes, lettuces and carnations. For large installations

the author advocates the automatic dilution surface-watering system, in which the pressure of mains water is used to inject the concentrated nutrient solution into the distribution line. On a smaller scale it is more satisfactory to use automatic sub-irrigation, with a large storage tank of dilute solution periodically pumped up to flood the bed, and then allowed to drain back into the tank. No difference, of chemical content or vitamin C, has yet been shown between tomatoes grown in sand culture and in soil in England.

1902. BENTHAM, G. 631.589: 663.61

Soilless cultivation in Iraq.

North. Gdnr., 1947, 1: 112-7, 136-8.

The author describes an installation at an R.A.F. airfield where Best of All and Early Market tomatoes and Al and Golden Ball lettuces were grown during the hot season of 1946. The culture trough was built of brick, faced with concrete, twice coated with bituminous asphalt and filled with sand grading between 10 and 60 mesh sieves; it measured 30 ft. \times 3 ft. \times 14 in. internally, and was fitted with drainage pipes at one side of the cambered bottom. Nutrients: basic mixture 10 lb. NaNO_3 , $2\frac{1}{2}$ lb. K_2SO_4 , $3\frac{1}{2}$ lb. triple superphosphate, $3\frac{1}{2}$ lb. MgSO_4 , $5\frac{1}{2}$ lb. CaSO_4 . Twelve ounces of this mixture dissolved in 30 gal. water, with the addition of 3.4 g. FeSO_4 and 5.43 c.c. conc. H_2SO_4 , applied from a gravity tank through $\frac{3}{8}$ in. holes in 1 in. pipes at each side of the trough, constituted a dose to saturate the sand. Water and nutrients were applied alternately, nine times each over 24 months. During this period weekly maxima fell from 109.1° [F.] to 85° , and minima from 73.6° to 51.9° and humidities ranged from 11.8 to 21.3 min. and 43.7 to 55.5 max. Lettuces matured in 63 days from sowing, but tomatoes became generally weak after fruiting began.

1903. MARTY, A., AND MIRIMANOFF, A. 631.589: 663.61

En marge de la culture sur eau. (Troughs for soilless culture.)

Rev. hort. suisse, 1947, 20: 249-51, bibl. 2.

Anodized aluminium has advantages for lining troughs used for soilless culture; it is unaffected by the nutrient solutions used and is without effect on plants.

1904. KRYLOV, M. M. 631.67: 578.08

Automatic watering with distilled water. [Russian.]

Proc. Lenin Acad. agric. Sci., U.S.S.R., 1947, No. 2, pp. 45-8.

An apparatus is described and illustrated for automatically supplying, to experiment plants, water distilled from brine and a nutrient solution for use in arid regions where fresh water is unobtainable for such purposes.

1905. WELLENSIEK, S. J., AND GROOT, A. 631.531

Zaadwinning uit vleezige vruchten met behulp van zoutzuur. (Extracting seeds from fleshy fruits with the aid of hydrochloric acid.)

Overdr. Lab. Tuinb. Wageningen 34, pp. 4 [received 1947].

Hutton's seed extraction method [see *H.A.*, 13: 1417] proved useful with tomatoes, cucumbers and melons; it was also tested on asparagus, strawberries, bilberries, red currants and black currants, and it seems likely to be of general value. 20 c.c. commercial hydrochloric acid was used per kg. of fruit.

1906. PORTER, R. H., DURRELL, M., AND ROMM, H. J. 631.531

The use of 2,3,5-triphenyl-tetrazolium chloride as a measure of seed germinability.

Plant Physiol., 1947, 22: 149-59, bibl. 17.

Lakon's technique was followed; seeds are soaked in water

for several hours to initiate germination, then bisected through the embryo and a half of each seed is immersed in a colourless 1% solution of tetrazolium chloride (supplied from Germany) for 2-10 hours. Carmine staining of the vital parts, due to reduction of the salt, indicates a capacity to germinate. Tetrazolium tests generally agree with normal germination tests, but the method needs standardization.—Ames, Iowa.

Noted.

1907.

a BURSTRÖM, H. 631.84
The nitrate nutrition of plants. A general survey of the occurrence and assimilation of nitrate.
Ann. agric. Coll. Sweden, 1946, 13: 1-86, bibl. pp. 10.

b COMAR, C. L., AND NELLER, J. R. 631.85+631.416.2
Radioactive phosphorus procedures as applied to soil and plant research.
Plant Physiol., 1947, 22: 174-80, bibl. 8.

c DROUINEAU, G., AND GOUNY, P. 631.416.12/13
Contribution à l'étude du dosage de l'azote nitrique par la méthode Devarda. (The estimation of nitrate nitrogen by the Devarda method.)
Ann. agron. Paris, 1947, 17: 154-64, bibl. 13.

d FILEWICZ, W. 632.111
Sunspots warned us of the hard winter.
Grower, 1947, 27: 209-10, bibl. 6.

e FUEL EFFICIENCY BRANCH, MINISTRY OF FUEL AND POWER. 631.544
Boiler efficiency.
Agriculture, 1947, 54: 227-9.
Maintenance hints illustrated.

f HUDSON, J. P. 634/635(42)
Horticultural education in Great Britain.
Horticulture (J. roy. N.Z. Inst. Hort.), 1947, 16: 4: pp. 3-15, bibl. 7.

g LEYTON, L. [I], AND DIMBLEBY, G. W. [II]. 634.9: 581.14
Soil conditions and tree growth. I. Physiological aspects of the tree soil complex. II. Soil factors.
Chem. Industr., 1947, 66: 558-60, 560-2, bibl. 33 and 15.

h LUNDEGÅRDH, P. H. 631.85
Quantitative spectral analysis as applied to the determination of phosphorus in plants.
Ann. agric. Coll. Sweden, 1946, 13: 274-89, bibl. 11.

i SHRANK, A. R. 577.17
The effect of light on the electrical polarity and the rate of elongation of the *Avena* coleoptile.
Plant Physiol., 1946, 21: 467-75, bibl. 17.

j SMITH, F. G., LANGELAND, W. E., AND STOTZ, E. 577.17
The effect of indole-3-acetic acid in the diastase charcoal model system.
Plant Physiol., 1947, 22: 300-7, bibl. 9.
Eyster's paper [*H.A.*, 16: 655c] is criticized.

k WOOD, J. G. 581.192
Nitrogenous constituents of plants.
Ann. Rev. Biochem., 1945, 24: 665-85, bibl. 69.

TREE FRUITS, DECIDUOUS.*

General.

1908. ALI, S. 634.1/8(794)
The fruit empire of California.
Punjab Fruit J., 1947, 11: 214-21.
 A short, popular description of the California fruit industry, with notes on the different crops and their value in 1945. The conclusion is reached that California owes its agricultural prosperity to the co-operative marketing associations which act as buying and selling agents for their members.
1909. LECRENJER, A. 634.1/7
L'arboriculture fruitière et la recherche scientifique. (Scientific research on tree fruits.)
Ann. Gembloux, 1947, 53: 133-9, bibl. 19.
 A general account of several aspects of research on fruit trees and storage, principally in countries other than Belgium.
1910. REBOUR, H. 634.1/8(65)
La modernisation de notre arboriculture. (Modernizing fruit growing.)
Fruits d'Outre-Mer, 1947, 2: 187-90.
 The author, Chef du Service de l'Arboriculture de l'Algérie, outlines a programme of orchard research. This should be largely of a practical nature so as to benefit fruit growers and thus induce them to provide funds for, and co-operate generally with, the scientific work. To make the best use of scientific staff, specialists with a good horticultural background and a working knowledge of foreign languages should work together at a national research station, the director of which should be fully in touch with the needs of grower and market. Numerous observation plots scattered through the country, and farm to farm enquiries, should yield additional data for consideration at the central station. Attention should be paid to the cultivation of varieties of national rather than local popularity. Moreover, research services in metropolitan and overseas France should be more closely linked.
1911. PEARCE, S. C. 634.1/2: 519
The measurement of fruit crops by sampling.
A.R. East Malling Res. Stat. for 1946, 1947, A30, pp. 77-82, bibl. 9.
 The methods evolved at the East Malling Research Station for estimating the total weight and fruit size of crops of apples, pears and plums, and fruit colour for apples, are described. The methods were evolved for English conditions; weights are in pounds and a "box" means the standard bushel orchard box of English fruit growing. The principles, however, should be generally valid and notes are given on the adaptation of the methods to other conditions.
1912. MONTGOMERY, H. B. S. 634.1/2(42)
Future plantings of top fruit.
Grower, 1947, 28: 302-3.
 A highly condensed article in which the author sets forth the principles, based on research, which should guide English growers in drawing up their planting programmes. The article touches briefly on: soil requirements, orchard sites, windbreaks, the type of fruit to grow, choice of rootstocks, spacing of trees, pruning, cultivation practices, cover crops, grass cover, spraying, fruit varieties to plant, pollination and the arrangement of trees.
1913. PRESTON, A. P., AND STANTON, D. V. 634.1/7-1.4
A soil survey of the new Bradbourne experimental orchards [at East Malling].
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 55-61, bibl. 5.
 The new plantations of dessert apples called Churchfields

and Larkfield have recently been planted on the Bradbourne land to meet experimental needs for future years. From the data obtained from a detailed soil survey, by auger borings, soil profiles were determined and typical cross-sections are illustrated. The Churchfield plantation is a very uniform stretch of Pleistocene alluvial drift overlying the Hythe Beds division of the Lower Greensand. The soil is a sandy loam at the surface stiffening below to a sandy clay loam. The Larkfield plantation lies on the outcrop of the Folkestone Beds, the uppermost division of the Lower Greensand.

1914. HOLBECH, J. A. 634.1/7
The preparation of land for planting fruit trees.
Agric. Gaz. N.S.W., 1947, 58: 187-8.
 Instructions are given on clearing timbered land with bulldozers and rippers, constructing a rabbit-proof fence, subsoiling, methods of planting in relation to contours, and soil erosion and contour planting.
1915. COX, M. B. 631.3: 634.993
Brush and tree removing machinery.
Bull. Okla agric. Exp. Stat. B.310, 1947, pp. 32, bibl. 11.
 Various types of machines are described, illustrated and discussed. Power brush-mowers were the most satisfactory for light brush with stems up to 1½ inches in diameter. The brush-beater, constructed on the principle of the flail-tank, did excellent work in sage brush but did not work well in thick or tall and tough brush. A shredder type beater which is being developed appears to have great possibilities as a means for removing heavy growths. Reference is made to several types of portable power-saws, two of which gave outstanding results. A promising method for removing brush with a tractor-saw towing a buck-rake is described. Tree- and bull-dozer were not tested, but trials elsewhere indicate that careless and unskilled work with these machines gives rise to serious erosion hazards and delays the development of a grass cover. There is need for a machine of the giant stalk-cutter type for crushing and breaking brush and trees which have been poisoned with chemicals.
1916. BRICHET, J. 634.1/8-1.513
L'«explosif agricole» puissant moyen de développement de nos productions fruitières. (The use of explosives in establishing orchards.)
Fruits et Prim., 1946, 16: 69-71.
 The author points out the enhanced value of the use of explosives in preparing planting holes when labour is a difficult problem, and mentions the residual manurial value of the tri-nitro group.
1917. RUBIN, S. S. 634.1/2-1.536
The arrangement of trees in an orchard. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947, No. 3, pp. 22-5.
 The advantages of mixed varieties in orchards are: (1) Efficient pollination is ensured. (2) Because of the different environmental needs of the varieties the trees are more vigorous and more resistant to diseases. In a pure plantation each tree is a source of infection for neighbouring trees.
1918. BEAKBANE, A. B. 634.11 + 634.13
Intensive methods of apple and pear growing.
J. roy. hort. Soc., 1947, 72: 145-55.
 The author describes the training and pruning of dwarf bush, dwarf pyramid and cordon trees for the small garden. For apples M.IX should be used as rootstock for spur-bearing varieties, which must be so chosen as to avoid trouble with pollination (*Leaf. John Innes hort. Inst. 4; H.A.*, 11: 1105). Quince A or C should be used for pears. Cordons may be planted 2 or 3 ft. apart in rows 6 ft. wide

running north and south. Dwarf pyramids should be planted at 3×6 ft., and dwarf bushes at 8-10 ft. square. Cordon trees at East Malling have yielded 700 bushels per acre at 10 years.

1919. WALLACE, [T.] 634.11: 663.3
Problems of grass orchard management.
Fruitgrower, 1947, 104: 477-8.

The author discusses the management of grass in orchards of cider apples. Nitrogen starvation must be avoided; this may be done by including clovers in the seeds mixture, or by grazing or cutting, but the orchard should not be used for hay.

1920. AUBERT, P. 634.1/7
Sur quelques problèmes que pose l'arboriculture fruitière en montagne. (The culture of fruit trees in the mountains.)
Rev. romande Agric. Vitic. 1945, 1: 7/8: 7-8.

The problem of growing fruit trees at high altitudes in Switzerland is discussed. The difficulties encountered are: (1) The very low temperatures in winter, resulting in winter injury. The effect can be mitigated to some extent by liming the trunks after the first frost. (2) Late spring frosts, which may occur in June or even later. (3) High rainfall, which encourages fungal diseases. Resistant varieties should be chosen when possible. (4) Violent winds, so that the trees must be securely staked. The fruit trees that give the best results at high altitudes are the apple and plum, then the cherry and last the pear. The apple is the most adaptable to these conditions; a large number of varieties can be grown but only a few mature their fruit. With regard to pears, it is useless to try to grow them as isolated trees at those altitudes, and they should be grown only on espaliers with protection, and those varieties should be selected that are sufficiently early, such as Beurré Gifford, Précoce de Trévous, Monsallard, William's Bon Chrétien and Louise Bonne d'Avranches.

1921. BROADFOOT, H., AND WHITTAKER, E. C. 634.11(944)
Apple growing in New South Wales.
Agric. Gaz. N.S.W., 1946, 57: 414-7, 476-9, 530-4, 638; 1947, 58: 22-5, 78-80, 132-6, 151, 188-91.

A series of articles covering all aspects of apple growing in New South Wales, viz. suitability of districts and soils, varieties, rootstocks, influence of picking and harvesting methods on the storage life of the fruit and returns to grower; soil management (soil erosion, maintenance of fertility, methods of cultivation, soil moisture, cover crops), pruning, reworking, control of pests and diseases, and plant nutrients (major and minor). The two minor elements which are of most importance in New South Wales are boron and zinc; their deficiency symptoms are described.

1922. LIBES, R. 634.13
La culture du poirier à Cabannes (Bouches-du-Rhône) et dans les états américains du Pacifique. (Pear culture at Cabannes and in the Pacific States of America.)
Prog. agric. vitic., 1947, 127: 395-9, 423-9.

The author compares the conditions and operations in pear cultures at Cabannes and in the Pacific States of North America. The pear soils in the American States are better in quality and depth, and the trees more widely spaced. Free rootstocks are used almost exclusively in America; at Cabannes the trees are on quince but become scion rooting. At Cabannes the trees are formed too slowly with too many branches; because of the mistral the trees are kept low. On the Pacific coast the trees are formed as quickly as possible on vigorous rootstocks, with little or no pruning during early development, the aim being to obtain large trees with 4 or 5 strong limbs. The more modern methods adopted in America yield better results.

1923. PHILP, G. L. 634.23(794)
Cherry culture in California.
Circ. Calif. agric. Ext. Serv. 46, 1947, pp. 51, bibl. 18.

The main varieties of sweet cherries grown in California are Chapman, Black Tartarian, Bing, Napoleon, Republican, and Lambert, in order of maturity. Mazzard is the stock most generally used; mahaleb is used on dry soils and the Stockton Morello on heavy, wet soils. Bing, Lambert and Napoleon flower late and are inter-sterile; a table of compatibilities is given to guide the planter in his choice of varieties. The bulletin also deals with the pests and diseases of the cherry, its planting, pruning and harvesting.

1924. CAIRASCHI, E.-A. 634.22(443.8)
La culture du mirabellier en Lorraine. (The culture of the Mirabelle in Lorraine.)
Prog. agric. vitic., 1947, 128: 80-3.

Notes on the Mirabelle plum (*Prunus insititia*), its origin, varieties, culture, pests and diseases, and the standardization and exportation of the fruit. Two varieties are grown in Lorraine, the Mirabelle de Nancy and the Mirabelle de Metz, the latter confined to the Moselle valley. The chief rootstocks used are St. Julien, a vigorous variety for fertile soils, and the Myrobolan Blanc for dry and calcareous soils.

1925. MARTINOLI, L. 634.25(494)
Quelques notes sur la culture de la pêche "Elberta" au Tessin. (The culture of the Elberta peach in Tessin.)
Rev. romande Agric. Vitic., 1945, 1: 10: 5-6 [received 1947].

The Elberta peach has become established in the canton of Tessin, Switzerland, and produces excellent fruit devoid of the bitter taste frequently noticed in the Italian Elberta. One of the chief factors in favour of its being grown there is its extraordinary adaptability to the rather light, sandy and pebbly soils mostly cultivated in Tessin. Another advantage of this variety is the development of both vegetative and fruiting buds along the whole length of the branches, so that it is relatively easy to maintain, with spring, and particularly summer, pruning, a tree that is fruitful below and not devoid of fruit towards the top, showing a tendency common in peaches.

1926. BARRY, J. 634.38: 638.2
Mulberry planting.
Proc. agric. Soc. Trin. Tob., 1946, 46: 139-47.

The essential requirements for establishing a silkworm industry are enumerated. An optimistic view is taken of sericultural prospects in the Caribbean area.

1927. BIRKINA, B. H. 638.2: 634.38
The effects of minor elements on the growth and development of the Pernyi silkworm. [Russian.]
Proc. Lenin Acad. agric. Sci., U.S.S.R., 1947, No. 2, pp. 3-9, bibl. 23.

Applying salts of manganese, copper or zinc, at concentrations of 1: 10,000 g/mol., to leaves fed to the Pernyi silkworm (*Antheraea pernyi*) hastened the development of the caterpillars, reduced the larval period by 12-16 days and increased the weight and size of caterpillars and the size of the cocoons. Feeding the caterpillars with these microelements in concentrations of 1: 1,000 g/mol. killed 90 to 91.5%. Technical studies showed that these microelements at the lower concentrations had no ill effect on the quality of the cocoon silk fibres. The results are of practical importance. Reducing the feeding period by 12 to 16 days ensures an early cessation to feeding and earlier provision of breeding material.

1928. SHULTIS, A. 634.63(794)
California olives, situation and outlook, 1947.
Circ. Calif. agric. Exp. Stat. 370, 1947, pp. 23.
Production of olives in California is likely to increase

slightly during the next few years; the present demand may not be sustained. The outlook does not justify new plantings. The Manzanillo olive is now favoured for general purposes.

1929. SIMONNEAU, P. 634.63(61)
L'oliveira sigoise. (The cultivation of the "Sigoise" olive.)

Fruits et Prim., 1946, 16: 374-6.

An account of the cultivation, manuring, irrigation and harvesting of olives on the plain of Sig, near Oran.

1930. RENAUD, M. 634.63(61)
Création et vie d'une olivette en Kabylie. (The life history of the olive yards of Kabylie.)

Fruits et Prim., 1947, 17: 12-15.

The author analyses the decline in yield of these olives; cultivated by natives, which he attributes to excessive intercropping and neglect. At the same time processing and marketing are so inefficient that an oil of poor quality and low value is produced.

1931. CHAPTAL, L. 634.63: 581.036
Sur quelques relations entre les conditions atmosphériques et la production d'huile d'olive. (Meteorological conditions and the production of olive oil.)

C.R. Acad. Agric. Fr., 1940, 26: 985-8 [received 1947].

From 20 years' observations the author concludes that the oil content of olives has been high when (1) the total insolation in June and July was not less than 675 hours, (2) the rainfall during those months was not greater than 30 mm., and (3) the total rainfall for October and November reached 150 mm.

1932. CHAPTAL, L., and RENAUD, P. 634.63-1.459
Un essai de protection contre l'érosion du sol d'une plantation d'oliviers. (A trial to prevent soil erosion in an olive plantation.)

C.R. Acad. Agric. Fr., 1942, 28: 497-9 [received 1947].

Good results in preventing soil erosion in an olive plantation were obtained by interrowing, in lines perpendicular to the slope, with bird's-foot trefoil (*Lotus corniculatus*), which, moreover, served as a good green manure.

Breeding and varieties.

1933. SPINKS, G. T. 634.1/7-1.523
Progress report on fruit breeding.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 20-3, bibl. 1.

The fruit breeding work at Long Ashton from 1938 to 1946 is outlined. The newer seedling varieties showing special promise are: Apple, Taunton Cross. Pears, Bristol Cross, Cheltenham Cross. Plums, Severn Cross, Frome Cross, Thames Cross. Black currants, Mendip Cross, Cotswold Cross, Malvern Cross.

1934. ISAEV, S. I. 634: 575.182
The role of the maternal plant in the formation of the hereditary constitution in hybrids. [Russian.]

Agrobiologija (Agrobiology), 1946, No. 2, pp. 87-96.

In 1938 over 60,000 apple seedlings from various parental combinations were sown, and in the following year, after an extremely severe winter, an examination of the seedlings showed that in crossing varieties similar in winter hardness, such as central Russian varieties \times central Russian varieties or Mičurin varieties \times Mičurin varieties, the hardness of the seedlings was the same in direct and reciprocal crosses. The differences between reciprocal hybrids became evident when varieties differing in winter hardness were crossed, as for instance the central Russian variety Antonovka with the

less resistant Baltic variety Pepinka Litovskaja [Lithuanian Pippin]. The difference was most marked in crosses between varieties with extreme difference in hardness, such as central Russian varieties and southern varieties. In such cases there was a definite and sometimes very marked reduction of hardness when the southern variety was used as seed parent. Similarly, when Mičurin's *Sphaerotheca*-resistant gooseberry was used as seed parent, the majority of the hybrids were resistant, whereas in the reciprocal cross the hybrids were mainly susceptible. In the plum cross Vengerka \times Skorospelka Rozovaja, only one out of 71 seedlings survived the winter, whereas in the reciprocal cross 78 out of 213 survived. Puškarev found that when the blight-resistant hybrid of *Solanum demissum* \times *S. tuberosum* was crossed with domestic potato varieties, it gave 10% more resistant hybrids when serving as seed parent. The author inclines to the Mičurin viewpoint that the hereditary constitution of the zygote is influenced by the environmental factors to which it is subjected in its early development. The maternal plant evidently acts as a particularly powerful mentor, acting as it does in the very early stages of the development of the embryo. In support of this interpretation a further experiment is reported. A cross was made between Golden Grimes, a tender American apple, and Koričnec Polosatoc [Striped Cinnamon], a hardy Russian form. The hybrid, contrary to expectation, was hardy, but it was found that the maternal plant of Golden Grimes was grafted on a rootstock of a hardy variety Antonovka, the nutrient materials of which had evidently influenced the hybrid. The utilization of this influence in breeding work is recommended. Thus for producing high quality, hardy apples for Siberia, the maternal plant should be a hardy Reinette grafted on to a large-fruited southern dessert form, so as to introduce the maximum influence of the dessert type.

1935. LESJUK, E. A. 634: 575.127(47)
Results of the industrial and biological study of I. V. Mičurin's fruit varieties. [Russian.]

Agrobiologija (Agrobiology), 1946, No. 2, pp. 120-2.

Observations have been made on the behaviour of the Mičurin varieties now growing in the orchards. The most frost-resistant apples were Esaul Ermaka, Kitaika Anisovaja [Anise Crab], Desertnaja [Dessert Crab], Kitaika Zolotaja [Golden Crab], Tazėnoe, Filja and Flava; pears distinguished for frost resistance included Beurré Zelenaja Letnjaja [Winter Green Beurré], Beurré Kozlovskaja and Beurré Blankovaja, while frost-resistant sour cherries obtained from crossing cultivated varieties with *Prunus fruticosa* included Nadežda, Krupskaja, Polzir, Polevka and Plodorodnaja Mičurina [Mičurin's Prolific]. Many of the Mičurin apple varieties begin to bear fruit early, in the fourth to fifth year after budding, and many are characterized by high yields, up to 245 kg. per tree. The most productive varieties are named for the apples and other fruits; also those characterized by the best dessert quality, most attractive appearance of fruit, highest keeping quality, resistance to scab and to other diseases.

1936. BLACK, M. W. 634.1/2(68.01)-1.55: 581.036.5
Deciduous fruit varieties for the western Cape Province [of South Africa].

Fng S. Afr., 1947, 22: 645-56, bibl. 1.

The choice of varieties is discussed, more particularly in relation to the phenomenon of delayed foliation caused by mild winters. Lists are given of the more important varieties of peaches, nectarines, plums, apples and pears with notes on their cropping season, commercial value, resistance to delayed foliation and the areas in which it is suggested that they should prove successful. It is hoped that as a result of extensive yield trials and breeding work a more suitable range of varieties will be available to the industry in the near future.

1937. TALBERT, T. J., AND HIBBARD, A. D. 634.1(8)(778)

Selecting fruit varieties [for Missouri].

Bull. Mo. agric. Exp. Stat. 437, 1941, pp. 51 [received 1947].

Lists of varieties of soft and top fruits suitable for commercial growing and roadside marketing in Missouri. Pollination problems are indicated.

1938. TOENJES, W. 634.11
The Macoun apple.
Quart. Bull. Mich. agric. Exp. Stat. 1946, 28: 189-90.

It is noted that the Macoun apple set a full crop in 1945 in spite of adverse spring weather conditions, which caused a failure in most other varieties. The variety has many other good qualities to commend it, but being still in the trial stage it cannot yet be recommended for extensive planting.

1939. GRANT, E. P. 634.11: 577.16

Apples as a source of vitamin C.

Sci. Agric., 1947, 27: 162-4, bibl. 7.

Vitamin C content of apples depends on the variety and it is greatest in their skins; dessert varieties Wagener, Northern Spy and Russet are good sources, but it is suggested that breeding might produce a dessert apple much richer than these.—Ottawa.

1940. SAVIDGE, C. 634.11: 663.3

Cider apple varieties and their care.

Fruitgrower, 1947, 104: 476-7.

A popular account is given of the performance of cider apple varieties in the Burghill trial orchard, Herefordshire. The more prolific varieties produced six times the official crop estimate for England and Wales, over 16 years. Good cropping is associated with freedom from canker, and varieties that do not respond to spraying should be grafted. In addition to tar-oil applied in winter, lime-sulphur is sprayed at the green cluster stage and again at petal fall. Cider apples suffer less from frost than market varieties. The more promising varieties are mentioned.

1941. SAVIDGE, C. 634.11: 663.3

Cider apple production in Herefordshire: results from Burghill trial orchard, 1931-46.

A.R. Long Ashton Res. Stat. 1946, 1947, pp. 116-26, bibl. 8.

Observations on the relative merits and orchard behaviour, including resistance to frost, of certain varieties of cider apples for 1931 to 1946 are recorded and described. The results of certain spray treatments, tabulated and examined, emphasize the fact that three sprayings each year significantly increase the crop yields of varieties resistant to apple canker fungus [*Nectria galligena*] and are economical and profitable. The incidence of canker adversely affects fruit yield and the spray treatments had no significant effect in increasing the yield from canker-susceptible varieties. Those varieties which are most affected with apple canker are almost useless. Only approved varieties should be planted.

1942. AUBERT, P. 634.13

Poires d'hiver. (Winter pears.)

Rev. hort. suisse, 1947, 20: 27-32.

A review of the qualities of nine varieties adapted for cultivation in French Switzerland. Doyenné du Comice and Passe-Crassane are described at some length. Rootstocks and tree forms are discussed and the behaviour of the fruit in storage is described for each variety.

1943. FLORY, W. S. 634.22: 581.162.3

Crossing relationships among hybrid and specific plum varieties, and among the several *Prunus* species which are involved.

Amer. J. Bot., 1947, 34: 330-5, bibl. 6.

As a result of work in Texas, the author lists effective pollinators for the following *Prunus* groups: (1) for *hortulana*

other *hortulana*, or *munsoniana* varieties; (2) for *munsoniana hortulana* or *salicina* varieties; (3) for *salicina* most other varieties which are not of hybrid origin, and a few of these; (4) for Asiatic American species hybrids native *angustifolia*, *munsoniana* and other *salicina* varieties, also the Asiatic hybrid Wickson. Within each species, some varieties may be more, or less, effective.

1944. KÁRPÁTI, Z. 634.23

Vizsgálatok a hazai cerasus alnemzetségbe tartozó hazai prunusokon. (Investigation into types of *Prunus cerasus*.) [Hungarian, German summary 1+ pp.]

Bull. Hungarian Coll. Hort. Vit., 1944, 10: 66-80 [received 1947].

The author describes variations found in *Prunus avium*, *P. mohácsyana*, *P. fruticosa*, *P. eminens* and *P. cerasus*.

1945. McMUNN, R. L. 634.25(773)

Peaches of Illinois origin gaining favor.

Newsl. Ill. St. hort. Soc., 1946, No. 8, pp. 2.

More reference in new peach plantings in Illinois is now being given to two varieties, which originated in the State, Gage and Hinner; at present these two varieties make up 10-38% of an acreage of over 5,000 covered by the survey. A list of peach varieties grown in Illinois with percentages of each and preferences indicated for new plantings is presented.

1946. CRANE, M. B. 634.23-1.521

An extended trial of seedling cherries.

J. Pomol., 1947, 23: 109-11.

This article serves as an introduction to the one following. Of new seedling cherry varieties raised at the John Innes Horticultural Institution from crossing commercial varieties, selections have been made and trees planted at the Kent Farm Institute. Five have proved worthy of commercial introduction and are named.—John Innes Horticultural Institution, Merton.

1947. HART, R. 634.23-1.521

The new Merton cherries.

J. Pomol., 1947, 23: 112-6.

A trial of 13 selected Merton seedling cherry varieties is described. A table shows the bacterial canker mortality figures of these and of six commercial varieties. Detailed descriptions, with photographs, are given of the five new varieties that are now introduced to commercial culture. Of these, Merton Heart is markedly resistant to bacterial canker (*Pseudomonas mors-prunorum*) and to blossom wilt (*Sclerotinia laxa*), and Merton Bigarreau "is probably the most important of Crane's introductions. It has the size and quality of a Noble without the astringent under-flavour the latter often exhibits when not grown under absolutely tip-top conditions"—Kent Farm Institute, Borden.

1948. CIFERRI, R. 634.63

Recenti progressi degli studi botanico-agrari sull'olivo. (Recent progress in botanical studies of the cultivated olive.)

Reprinted from *Convegno di Studi Olivicoli*, 15-17 May, 1942, pp. 52, bibl. 44. Reale Accademia dei Georgofili Ente Economico dell' Olivicoltura, Florence.

The cultivated olive with special reference to varieties grown in Italy including notes on origin, classification, etc., and an identification key.

Propagation and rootstocks.

1949. STEVENSON, V. W. 631.531/535

New rooting medium for eliminating check.

Grower, 1947, 27: 592-3.

Vermiculite, produced by the internal explosion of a form of mica, is very light and absorbent, and is recommended

as a rooting medium or for raising seedlings, when fortified by nutrients; it is claimed that damage is reduced when transplanting. The substance has been developed by Dr. V. T. Stoutemeyer, U.S.D.A., and is registered as Exflor in the U.K.

1950. AROEIRA, J. S. 634.1/2-1.541
A enxertia na propagação de plantas frutíferas. (Grafting and budding in the propagation of fruit trees.)
Ceres, 1944, 5: 242-60, 359-70, bibl. 7 [received 1947].

Part I. General theory. II. Tools and materials. III. An illustrated account of various methods of budding and grafting. [For part IV., on the practical application of different methods, see *H.A.*, 15: 1433.]

1951. ELDER, T. 634.11-1.541
Quicker grafting with plastic tape.
Grower, 1947, 27: 568.

"Lassovic", a proprietary adhesive tape of polyvinyl chloride, $\frac{1}{8}$ in. wide, protects apple grafts for a year out of doors.

1952. AUBERT, P. 634.1/7-1.541
Essais de greffage d'arbres fruitiers. (Fruit tree grafting trials.)
Rev. romande Agric. Vitic., 1945, 1: 10: 4-5.

This article supplies data on the behaviour in the field of trees resulting from the shield budding experiments described in a previous article [see 1953]. It is concluded that the choice of buds for shield-budding when they are taken from the same tree is of no significance since they all give rise to trees of similar character, fertility and vigour.

1953. AUBERT, P. 634.13-1.541.5
Essais d'écussonnage de poiriers Beurré Hardy. (Shield-budding trials with Beurré Hardy pear.)
Rev. romande Agric. Vitic. 1945, 1: 6: 7-8 [received 1947].

Shield-budding of pome-fruit trees is said to present no special difficulties to the experienced propagator. When conditions are favourable—the stock with sap ascending freely, and the scion fresh—a good operator can obtain 98 or even 100% successes. The author's experiments in budding Beurré Hardy on Angers quince have shown that (1) Buds taken from the base or at the extremity of unripened graft-wood can be used for shield-budding even if the buds are only slightly developed or invisible. (2) Buds from fruiting brindilles produce scions as vigorous as those obtained from buds of ordinary branches. (3) Dards should be avoided as yielding poor results.

1954. AUBERT, P. 634.23-1.541
Essais de greffage de cerisiers. (Grafting cherries.)
Rev. romande Agric. Vitic. 1945, 1: 12: 5-7; 1946, 2: 20-2.
Publ. Stat. féd. Ess. vitic. arboric. Chimie agric., Lausanne, 348, 1946, 11 pp.

In the first of these articles (all under the same title) the author describes grafting experiments in autumn and winter. Ten groups of cherry trees were grafted at approximately equal intervals from September 1927 to April 1928. The scions were from an undetermined variety and the rootstocks were 3-year-old seedlings of *Prunus cerasus avium*. The behaviour of the various groups is described, the general conclusion drawn from the data being that grafting cherries in autumn with fresh graft-wood gives excellent results with wedge grafts. With regard to crown grafting, it is best done while the trees are still in sap, the time depending on whether the year has been dry or humid. Wedge grafting carried out during the winter also gives good results if the weather is mild and if the operation is not immediately followed by severe frosts. However, winter grafting is not

recommended because the succeeding weather cannot be predicted. Spring grafts did not yield shoots so vigorous as the autumn grafts. Grafts made from April onwards with scions preserved in sand yielded unsatisfactory results. The second article continues with further grafting experiments carried out in 1930-31, with results which confirmed those recorded previously. The third publication records trials carried out in 1932-34 with special reference to crown grafting which is successful in August-September and in April-May, if sap is flowing and the scion is in proper condition. Crown grafts made in autumn unite before winter, and often the scion gets away with a better start than after spring grafting. In this last paper the results of the trials from 1927 to 1934 are summarized.

1955. BREVIGLIERI, N. 634.25-1.53
Ricerche sullo sviluppo delle piante di pesco (apparato radicale e parte aerea) in relazione ad alcuni sistemi di piantagione. (Growth of peach trees in relation to the method of raising.)
Riv. Frutticoltura, 1941, 5: 113-32, bibl. 28 [received 1947].

The trees submitted to tests consisted of (1) Those planted out a year after budding, i.e. the usual method. (2) Seedlings worked with a dormant bud. (3) Seedlings worked *in situ*. (4) Plants worked with growing bud in June or July. (5) Seedlings sown *in situ*. Among deductions made as the result of 12 years' observations are the following: The greatest trunk development at the end of 12 years occurred among group (5), followed by group (1) and then by group (2). Total production varied little during the period as between the different groups. The rate of growth in the nursery of the tap root decreased considerably and practically came to a standstill in some cases in the first year. Its growth was resumed in the second year to a limited extent in some cases, whereas the secondary roots increased greatly in length and breadth. In the 12th year most of the roots were found in the stratum 20 to 70 cm. below soil level. Root growth was nearly double that of the aerial parts. It was mainly horizontal and was greatly affected by the type of planting hole, large holes giving the best growth. Differences of root growth according to method of planting are discussed in some detail. The largest root system was that of group (5), i.e. seedlings. It may be noted that at the end of the period in this group no trace of tap root remained visible.

1956. CAPUCCI, C. 734.1/8-1.536-1.67
Nota preliminare sull'accrescimento delle piante da frutto e da campagna in vivaio irriguo ed asciutto e sul successivo sviluppo nel primo anno di vita a dimora. (A preliminary note on the growth of fruit and other plants according to whether they are raised in irrigated or unirrigated nurseries.)
Riv. Frutticoltura, 1942, 6: 95-104 [received 1947].

Summarizing trials which were carried out in Emilia and Romagna during the years 1934-41 on a number of fruit species, vines and maples, the author decides that plants which behave most satisfactorily in the field are those derived from material raised in non-irrigated nurseries. Abundant irrigation, e.g. at intervals of 8 days, does lasting damage to the material so treated.

1957. HILL, R., AND BEAKBANE, A. B. 631.541.11: 634.1/2: 581.4

The application of biological observations on wild and naturalized species and varieties of fruit trees to the study of fruit tree rootstocks. A preliminary study of some *Prunus* species.
J. Pomol., 1947, 23: 117-33, bibl. 12.

The main desirable properties of fruit tree rootstocks are: ease of vegetative propagation, ease of working, vigour, and compatibility of rootstock and scion. It is shown how

the effect of the unworked rootstocks of extreme types on their own stems agrees in general with their effect on scions worked on them. Wild and naturalized fruit trees show a greater range of useful material than is usually available in ordinary horticultural practice. Methods are discussed for the rapid recognition in the field of good types for trial. The data on habit of growth in relation to amount of living tissue in roots obtained from the unworked, extreme dwarfing types of apple rootstocks apply also to certain species of *Prunus*. In estimating vigour it was necessary to measure the variation of bark percentage in relation to thickness of root. In an appendix are discussed (1) the graphical representation of variation of measurements on individuals, and (2) the variation of bark percentage with thickness of root in the same individual.—Biochemical Laboratory, Cambridge, and East Malling Research Station, Ken.

1958. BUDAGOVSKI, V. I. 634.1/2-1.541.11
I. V. Mičurin's work on rootstocks for fruit trees. [Russian.]
Agrobiologija (Agrobiology), 1946, No. 2, pp. 111-9.

It is recalled that Mičurin recommended specially the garden form of the Chinese crab (*Malus prunifolia*) for use as a winter-hardy and drought-resistant apple rootstock. A great variety of forms exists already, but the range of variation can be extended by raising seedlings. Figures are given which show that trees on rootstocks of *M. prunifolia* and some forms of *M. baccata* retained their roots almost undamaged in the severe winter of 1938/39. The *M. baccata* rootstocks, however, exert an unfavourable influence on the developing scion, and for this and other reasons are not recommended, except in the extreme north where other species will not grow. For pears, the most suitable rootstock was *Pyrus ussuriensis* and some special organization for the production of seed, which is the limiting factor in its extension at present, is recommended. The local Siberian pear, Tonkovetka, also gives hardy rootstocks; Mičurin's quince, hybrid Northern, is the best dwarfing stock. Reference is made to Mičurin's experiments in the production of hardy dwarfing rootstocks for apple, sloe and cherry. Promising rootstocks for sour cherry have been obtained by the author in the Fergana valley, growing among pistachios; they are highly resistant both to frost and drought. For the production of hardy apple rootstocks, the author has crossed Paradise M. VIII with the garden forms of *M. prunifolia* and with a number of Mičurin's hardy seedlings, selecting the progeny for frost resistance and capacity for vegetative reproduction. The selected hybrids are now under investigation.

1959. HALL, J. W. 631.541.11: 634.11 + 634.13 + 634.22
Root stocks for apple, pear and plum trees.
Scot. Agric., 1947, 26: 166-72.

After an exposition of the rootstock work done at East Malling the author comes to the conclusion that the application of the latest methods in fruit growing should allow Scotland to become more self-supporting with early dessert and late culinary apples and Victoria plums. Pear growing remains risky, except in certain localities for which suitable varieties are named.

1960. SUDDS, R. H. 634.11-1.541.11
Apple rootstocks.
Trans. Ill. St. hort. Soc. for 1945, 1946, 79: 339-42.

The results of some rootstock studies in West Virginia are discussed and certain conclusions drawn, among them the following: The use of French Crab is not justified. There would appear to be considerable promise in the selection and introduction of rootstocks for inducing some degree of dwarfing with the more vigorous varieties when grown on

sting soils. Clonal rootstocks have made for somewhat more uniform growth and yield but soil variations will usually obscure these effects. No apple rootstock thus far tested has shown any resistance to black rootrot.

1961. VALLOT, J. 634.13-1.541.11
A propos du poirier sauvage de la Mamora.
(Concerning the wild pear of Mamora.)
Fruits et Prim., 1946, 16: 50.

The writer disapproves of the suggestion that the wild pears of Mamora should be top-worked [see *H.A.*, 16: 1271]. He tried this pear, thought to be *Pyrus cordata*, and rejected it as a rootstock for Morocco; it is liable to wind damage, it suckers too readily, and the Trieste quince is much more suitable. The wild population in the forest is too mixed to allow of effective methods of cultivation.

1962. ROACH, W. A. 631.8: 634.1/2-1.541.11
The rôle of mineral nutrition in the rootstock-scion effect. A progress report.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 88-94, bibl. 21.

Past work on, and the present position with regard to, the rôle of mineral nutrition in rootstock-scion effects are briefly reviewed. Results of preliminary work show that the rootstock exerts a considerable effect on the mineral composition of the scion worked on it. This effect is not merely quantitative; the relative proportions of a number of the elements are influenced considerably. An appendix by A. C. Mason describes chemical methods and another by F. H. Vanstone physical methods of analysis.

Pollination.*

1963. RIERA, F. J. 581.162.3: 634.1/8
Polinización y fecundación en fruticultura. Las principales formas de esterilidad en: cerezos, ciruelos, melocotoneros, albaricoqueros, perales y manzanos. (Pollination and fertilization in fruit culture. The chief forms of sterility in cherries, plums, peaches, apricots, pears and apples.)
An. Esc. Peritos agric. Barcelona, 1945, 5: 59-118.

The first part of this article deals with the forms of sterility in general and the various factors underlying sterility in orchard fruits—cherry, plum, peach, apricot, pears and apples. The various fruits are then taken in order and the varieties of each are classified according to their self-sterility or self-fertility. Suitable pollinizers for the self-sterile varieties are mentioned.

1964. SNYDER, J. C. 581.162.3: 634.1/2
Pollination results.
Better Fruit, 1947, 41: 10: 10, 12.
SNYDER, J. C.
Artificial pollinizing tests made.
Ibid., 1947, 41: 11: 10-11.

Trials on pollinating cherry and apple orchards by aeroplane and by bomb were carried out in Washington in 1945 and on a larger scale in 1946. The pollen was diluted at the rate of one part pollen to three parts diluent (*Lycopodium* in the case of the aeroplane). Both methods were found to secure uniform distribution of the pollen, but the bomb method of application was found to reduce germination. Pollination by plane increased fruit set in apples and cherries, but not significantly. At present, hand pollination must therefore continue to be relied upon.

In a second article the author reports on a comparative test, carried out in 1947 in a Yakima Delicious orchard, where a shot gun was used in addition to bombs and an air-driven jet at the end of a long pole. Results will be published later.

* See also 1943.

1965. STRUCKMEYER, B. E. 634.11: 581.162.3
Preliminary investigations on the pollination of
the Delicious.
Wis. Hort., 1947, 37: 118.

The low mean set of Delicious apples is due partly to the floral structure; the open petals, upright filaments and short pistils allow bees to collect nectar without effecting pollination. Remedial measures include the provision of a good pollen source by planting late-blossoming varieties (Northwestern Greening or Rome) contiguously, by grafting these on Delicious trees, or by hanging suitable bouquets in the orchard, and by the provision of bees close at hand.

1966. NOMBLOT, A. 634.1/7-2.111
Influence de l'époque de floraison des variétés
fruitières sur leur fertilité. (The influence of
time of flowering of fruit varieties on their
fruitfulness.)
C.R. Acad. Agric. Fr., 1944, 30: 269-71 [received
1947].

The risk of damage to fruit trees by late frosts is discussed in relation to the time of flowering of particular varieties, and to the preference shown by some growers for late varieties in order to avoid such damage. The author concludes from his observations that, under the climatic conditions in the neighbourhood of Paris, certain early varieties are fruitful while some late varieties are less so, and that fruitfulness depends not so much on the time of flowering as on such factors as site, cultivation, protection against prevailing winds, control of pests and diseases, and the nature of the varieties, their vigour and compatibility with their environment.

1967. HASEMAN, L. 638.14(778)
Beekeeping in Missouri.
Bull. Mo. agric. Exp. Stat. 305, 1947, pp. 52.

This bulletin deals briefly with the use of bees for pollinating fruit trees. The hives should be moved into the orchard after the cluster bud spray and removed before the first calyx spray. One colony can deal with one to five acres, depending on the weather; hives should be arranged so that the return flight is made with the assistance of the wind.

Growth.

1968. GERBALDI, C. 634.25: 581.144
Osservazioni sullo sviluppo delle gemme da
frutto del pesco durante l'inverno, in relazione
alla suscettibilità alla cascola pre-florale. (The
development of peach fruit buds in winter in
relation to their susceptibility to pre-blossom
fall.)
Riv. Frutticoltura, 1943, 7: 19-24, bibl. 16.

A review of the literature is followed by a discussion of observations made in the winter of 1940 near Ravenna on branches of single trees of 6 peach varieties. Briefly the following facts were disclosed: (1) The basal buds (those on the lowest 4-5 nodes of a branch) were smaller than the central ones, which in turn were smaller than the apical. (2) There are indications that these differences in size are more noticeable in the 3 varieties susceptible to pre-blossom drop than in the others. (3) It was not possible to establish that the buds of susceptible varieties made more growth during the period 7 February to 1 March, 1940, than those of resistant varieties. The data do not show a definite relation between increase in size and resistance characters.

1969. ULRICH, R. 634.1/7-1.547.66
Les repères du degré de maturité des fruits.
(Guides to the degree of maturity in fruit.)
Fruits d'Outre-mer, 1946, 1: 456-61; 1947, 2:
5-11, bibl. 52.

An outline of investigations carried out by various workers, mainly with apples, pears and citrus, in which one or more

of the following fruit characters were studied: colour, scent, flavour, mechanical and electrical properties of tissue, chemical characters of tissue and juice, physiology, anatomy and histology of the fruit and physical properties of juice. As a result of examining the various tests for maturity and pre-maturity the author concludes that no one of them at present merits complete confidence, and further that it is extremely doubtful whether any single test would ever suffice as a test of maturity: several should be used conjointly.

1970. ZORIN, F. M. 634.13: 581.143.32
A pear forming vegetative fruits.* [Russian.]
Agrobiologija (Agrobology), 1946, No. 2, pp.
135-9.

The so-called vegetative pear flowers normally in the middle of April, and then again some 2 to 3 weeks later, the flowers this time being mostly double, with up to 20 petals and 2 or sometimes 3 calyxes, one above the other. These begin to fuse without fertilization, and leaves in the vicinity are also included. On other branches, the petiole of a leaf may swell, or the petioles of several leaves may fuse and together swell out to form a false fruit resembling a proper pear but having no connexion with floral organs at all. From the apex of this false fruit proliferation may occur, giving rise to a second false fruit and so on. The form of the false fruit varies but it sometimes resembles a normal fruit very closely, both in form and flavour. The phenomenon seems to be characteristic of the variety and not the result of any attack by disease organisms. In view of its exceptionally early ripening, high dessert quality, good yield and almost entire freedom from codling moth and other pests and diseases, the variety is interesting from a practical standpoint as well as theoretically.

1971. KONOVALOV, I. N. 634.1: 581.47
The occurrence of stone cells in the fruit of
certain species of *Malus* Mill. [Russian.]
Sovetsk. Bot., 1946, 14: 262-9.

Some investigators have held that, for purposes of systematics, *Malus* spp. may be distinguished from *Pyrus* spp. by the presence of stone cells in their fruit. The microscopical examinations, carried out by the author of the present article in order to verify this conclusion, show that stone cells are most abundant in *Malus mandshurica* and *M. pallasiana*, are present but less abundant in *M. prunifolia*, *M. silvestris*, *M. niedzwetzkyana* and *M. sieversii*, and entirely absent from *M. domestica*, the varieties of which to be examined were Antonovka, Bymažnyi Renet, Anis, and Gušovka. Stone cells in *Pyrus ussuriensis* were both more abundant and more evenly distributed throughout the tissue of the fruit than in *Malus* spp.

Training, pruning and cultural treatment.

1972. JOUGAN, E. 634.1/2-1.546
Avantages et inconvénients des méthodes
modernes basées sur l'arcure généralisée, en
matière de plantations fruitières. (Advantages
and disadvantages of modern orchard methods,
based on arching.)
Rev. hort. suisse, 1946, 19: 177-81.
LUGEON, A.
Les avantages et inconvénients de l'arcure dans
les cultures fruitières commerciales. (Advantages
and disadvantages of arching in commercial
orchards.)
ibid., 1946, 19: 231-4.

The first writer considers that arching may be justified in present circumstances as a compromise between new and old methods of training. The second describes commercial plantations of dwarf pyramids grassed down, and of vertical cordons planted at 80 cm. (instead of 35 to 40 cm. used

* See also H.A., 9: 63 and 14: 1043.

earlier) by 1.50 to 2.50 m.; in both cases modified arching is practised and the plants are allowed to spread somewhat. More important than pruning (essential for orderliness and well coloured fruit), are spraying (without which there may be little or no crop) and manuring (for maintaining yields).

1973. JENNY, J. 634.1/2-1.546.3

Aperçu sur les échanges de chaleur dans les murs et espaliers et à proximité. (Note on heat exchange between walls and espaliers and their surroundings.)

Rev. hort. suisse, 1947, 20: 123-5, 153-5.

A discussion of how the material and orientation of a wall affect the protection it affords to espaliers.—Wädenswil.

1974. TALBERT, T. J. 631.542: 634.11 + 634.13

Pruning suggestions for apple and pear trees.

Circ. Mo. agric. Exp. Stat. 315, 1947, pp. 12.

Excessive pruning should be avoided at all stages. During the first 5 or 6 years after planting, trees should be pruned only for form building. Bearing trees should be pruned and trained for a maximum bearing surface exposed to sufficient sunlight to produce good colour. In Missouri pruning wounds need not be painted, but disinfection is advisable where fire blight and blister canker occur; suitable solutions include mercuric cyanide or corrosive sublimate (1 : 500 in water), and copper sulphate (1 lb. in 5 U.S. gal. water).

1975. ROGERS, W. S., AND PRESTON, A. P.

634.11-1.542

Renewal and established-spur pruning of mature apple trees: a progress report.

A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 49-54, bibl. 5.

The renewal and established-spur pruning systems are compared as applied to vigorous mature trees of Cox's Orange Pippin apple. During the first two years of the experiment the renewal-pruned trees suffered more severely than spur-pruned trees from petroleum spray damage. The blossoms on 1-, 2- and to a less extent 3-year-old wood tend to open later than those on spurs. As renewal-pruned trees have more of this younger wood than established-spur trees, their effective blossom period tends to be longer and they have a greater chance of good pollination and of possibly escaping certain forms of frost damage. In the second year of the trial the renewal-pruned trees had 66% more fruit than the spur-pruned ones, and the fruit was of better colour.

1976. BRYNER, W. 631.546: 634.11 + 634.13

Kürzer oder langer Fruchtholzschnitt? (Short or long pruning of fruiting wood?)

Schweiz. Z. Obst- u. Weinb., 1947, 56: 83-8, 103-5.

In 1940, espaliers were planted at Wädenswil consisting of 6 varieties each of apples (on M. II) and pears, with 6 trees to each variety. Two trees of each variety were trained to U-shapes at distances of 40, 60 and 80 cm. respectively between the limbs. Trees with a distance of 40 cm. were pruned according to the classical method (two summer prunings). With the 40- and 60-cm. trees, in which the branches were spaced at 40-60 cm., the lateral shoots were tied horizontally in July/August and all strong upright shoots were removed. In winter the elongation growth of the shoots was cut back to a degree which would assure the growing out of all buds. The fruiting wood was cut back according to the distance apart of the branches. The response of individual varieties to these treatments is illustrated in line drawings, and figures are presented—for the three branch distances of all 12 varieties—of increases in stem circumference during the whole period and of yields during 1943-46. In general, it was found that the most favourable results, as regards yields and growth, were

obtained in the espalier trees with branches spaced at 60 cm. With apples, yields in the 80 cm.-spaced group may be expected to improve in time, but the waiting period seems too long. For pear espaliers on quince 60 cm. must be regarded as the maximum distance, 40 cm. being preferable, if long espaliers are to be planted. Differences in varietal requirements are briefly mentioned. The author proposes to give a detailed report of his trials later.

1977. AUBERT, P. 631.542: 634.13

Essais de taille de poiriers nains. (Experiments in pruning dwarf pears.)

Publ. Stat. féd. Ess. vitic. arboric. Lausanne 349, 1946, pp. 16.

Three plots, each of 60 sq. m., were planted in 1927 with pears. The first held a line of seven Précoce de Trévoux [stock unspecified] 2.5 m. apart; these were arched and their branches were arched in turn, new laterals replacing the old. The second consisted of two rows of 22 U cordons of the same variety on quince, spaced 80 cm. apart and pruned in the classical method to 3-5 buds; the third plot was like the second, using Beurré Superfin on quince. In the early years plots 2 and 3 were split, one row of each being pruned also in the summer; but there was no effect on yield or size of fruit, so this treatment was stopped. With the vigorous Précoce de Trévoux arching induced earlier and heavier fruiting than did the classical pruning; but plot 2 was thinned to double spacing, half in 1938, half in 1940, and the yields of plots 1 and 2 were almost identical for the period 1943-45. On the other hand plot 3, with Beurré Superfin, produced more fruit than plot 1 over the whole period; the author points out that arching is only indicated for vigorous varieties.—Pully.

1978. DE WET, A. F., AND CONRADIE, W. J.

634.13-1.542

Pruning experiments with Winter Nelis pears.

Fmg S. Afr., 1947, 22: 604-8, bibl. 2.

In pruning experiments conducted in the Ceres district of Cape Province during the past season, pruning was shown to have a marked effect on the setting, cropping and growth of old Winter Nelis trees. [From authors' conclusions.]

1979. SOBRINHO, J. S., AND DE SOUSA, J. S. I.

634.14-1.542

Poda do marmeleiro. (Quince pruning.)

Rev. Agric. São Paulo, 1947, 22: 155-80, bibl. 9.

An illustrated account of how to prune the quince. Young plants should be topped to produce 3 or 4 branches 50 to 60 cm. above the ground; these should be cut back to 20 cm., choosing buds to form a goblet. A similar shape is desirable in the restoration of neglected trees. About four years later the short fruiting branches appear, after which form-pruning is confined to removing dead branches, cutting back the more vigorous branches to 25 cm., and keeping the centre open. Pruning for fruiting should be carried out each winter, towards the end in districts where the climate is more severe. One-year wood should be cut back to 25 cm. and any vegetative shoots produced in subsequent years should be cut back in the same way to encourage the production of brindilles.

1980. SNYDER, J. C. 634.11-1.542.27

Blossom thinning.

Better Fruit, 1947, 41: 10: 12, 17.

So far, Elgetol has been found the most effective chemical for blossom thinning by spraying.

1981. (LARSEN, F.) 634.25-1.542.27

Water spray is used to thin peach bloom.

Better Fruit, 1947, 41: 12: 10.

A grower in Washington discovered by chance that a jet water spray from a spray gun will thin peach blossom most satisfactorily. The operation, which causes less damage to bloom and foliage than brush thinning and is much

quicker, may be carried out any time during a period of 4, 5 or even 7 days after full bloom.

1982. PEARSE, H. L. 634.11-1.55: 577.17
The control of pre-harvest drop of apples [in South Africa].
Fmg. S. Afr., 1947, 22: 659-62, bibl. 1.

Reports indicate that growers are highly satisfied with the control of dropping achieved by using hormone sprays. It is suggested that the grower should apply the spray 3 weeks before the estimated date of harvesting.

1983. VYVYAN, M. C., AND BARLOW, H. W. B. 577.17: 634.11-1.55
Use of sprays to control fruit drop, especially that of young fruit of Cox's Orange Pippin.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 83-7, bibl. 14.

The heavy drop of young fruits in July, common in Cox's Orange Pippin, was checked by spraying with α -naphthaleneacetic acid on 1 July; the effect of the spray persisted for 3 months and the crop was increased 2- to 3-fold. The same spray decreased drop in, but had no effect on the keeping quality of, Barnack Beauty. It gave good control of pre-harvest drop in Worcester Pearmain. Control of drop in Worcester and Beauty of Bath had no effect on the crop borne in 1946.

1984. FRITZSCHE, R. 577.17: 634.11 + 634.13
Versuche zur Verhinderung des Fruchtfalles bei Kernobst kurz vor Reife. (The control of pre-harvest fruit drop in pome fruit.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 1-4.

A table shows the percentage of pre-harvest fruit drop in apples and pears in different parts of Switzerland following the applications of 0.0015% α -naphthylacetic acid (with and without a wetting agent) and of Geigy 800. With the apple varieties Gravenstein, Goldpearmain and Berlepsch and with the pear variety Le Lectier the reduction in fruit fall was considerable. With the first two varieties treated fruits were, in addition, better coloured and they matured more uniformly. The quality of the pear Le Lectier was also improved. On the other hand, the treatment did not affect the abnormally high fruit drop in Glockenapfel. Differences in the response of the same variety are probably due to the difficulty of deciding on the correct date of spraying in different localities. On the whole, pome fruit in Switzerland seems to require an earlier treatment than is recommended abroad, since at least 30 days appear to be the necessary interval between spraying and harvest. Further points to be investigated are: (1) Will the fruits containing codling moth larvae also be stopped from dropping, which would be a great disadvantage? (2) Can the anti-fruit drop spray be added to the application against the second codling moth generation? (3) Is the treatment of economic significance?—Wädenswil Research Station.

1985. THOMAS, P. H. 634.1/7-1.62
Drainage of orchard areas.
Tasm. J. Agric., 1946, 17: 342-3.

The various types of tile drainage are described. It is inadvisable to use tiles of less than 3 in. in diameter for lateral drains. Four-inch tiles are preferable, and are worth the extra outlay. The smaller the diameter, the more the danger of the line of drain being blocked. When it is considered that the least subsidence may cause an obstruction, it is obvious that the larger sized tile is the best.

1986. PEIKERT, F. W. 631.67: 634 + 635
Portable pipe irrigation practices in Michigan.
Quart. Bull. Mich. agric. Exp. Stat., 1947, 29: 192-204.

This survey of field irrigation practices in Michigan was conducted in the autumn of 1946 on 62 farms having portable pipe irrigation systems considered typical of the

about 250 similarly irrigated farms in the State. (1) Crops irrigated: supplemental irrigation is proving most profitable on small fruits, vegetables, potatoes, nursery stock and flowers. (2) Value and cost of irrigation: yields were greatly increased, though exact figures are not available, and the quality of the product was improved. The majority of farmers report that irrigation had no effect on earliness. Figures for cost of equipment and returns are given. (3) Annual cost of irrigation. (4) Application of irrigation; sources of water; use of wells; amounts of water required; number of irrigations per season. (5) Irrigation equipment: most farmers are using a quick-coupling galvanized pipe with a number of rotating sprinklers, though there is at present considerable interest in the use of aluminium pipe. The galvanized pipe comes in 16- and 20-foot lengths and ranges from 2 to 8 in. in diameter. The amount of labour required was found to average about 2 man-hours per acre for each irrigation. Labour may be saved by using the single high-pressure sprinkler which covers an acre in one setting, having a capacity of up to 450 gal. per minute. Several of these large sprinklers, mounted on a 2-wheel carriage, were in use during the past season. They require a pressure of 80-100 lb. per square inch. (6) Pumping plants.

1987. RUSINOV, D. P. 634.1/2-1.67
The aggregate and structural state of the soil in an irrigated orchard. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1945, No. 7-8, pp. 43-8, bibl. 6.

Details are given of the physical and chemical properties of the soil in an irrigated orchard where one half of the area remained fallow and the other half bore crops of lucerne. In general, the fallow section contained less water-resistant aggregates after waterings than that under lucerne crops. It is concluded that, to maintain the structure of the soil in an irrigated orchard, the land should remain fallow not longer than 1-2 years, and that lucerne should be grown afterwards to improve and maintain the structure and fertility of the soil.—The Crimean Experimental Amelioration Station.

1988. SIMONNEAU, P. 634.11(64)-1.67
La culture irriguée du pommier en Oranie Orientale. (The apple under irrigation in eastern Oran.)
Fruits et Prim., 1946, 16: 137-9.

The variety used is a red apple of Spanish origin, locally known as Llorca; active buds are grafted in July or September on rooted shoots of the local apple. The plants are spaced 6 to 8 m. apart and given farmyard manure in alternate years at the rate of 350 q. per ha., or more if intercropped with vegetables. The orchards are irrigated three or four times between February and May, and once in August; flowering occurs in March, and the yield may be 300 quintals per ha. This apple is too early to be damaged by codling moth, but aphids may be troublesome.

1989. (STATIONS DE RECHERCHE AGRONOMIQUE.) 631.8: 633/635(44)
Recherches sur la fertilisation effectuées en 1944-1945: par les stations agronomiques. (Manurial investigations carried out by French agricultural stations in 1944-1945.)
Ann. agron. Paris, 1946, 16: 246-322.

The paper includes short reports on the following investigations. (1) The ripening of apples and pears (L. Depardon, Blois). Analytical data show the increase in sugar and the destruction of acids in maturing apples and pears. (2) The influence of different factors on potato yields (G. Joret and H. Malterre, Amiens). The variety Bintje B de Somme was grown on 3 different soil types: (a) a dry lime soil at Amiens, (b) a medium-moist loam soil at Le Paraclet, (c) a very moist, alluvial humus soil at Rivery. Average yields for

3 years were 29.7, 69.8 and 78.8 kg. per 100 feet of row respectively, fertilizer applications being equal in all cases. Meteorological conditions affected the crops according to soil type. (3) *Manuring potatoes* (G. Joret and H. Malterre, Amiens). Organic manures and mineral fertilizers, though increasing yields considerably, had the effect of reducing the dry matter content (e.g. from 25 to 22.9% in the case of fertilizers) of the tuber and thereby the nutritive value per unit weight. (4) *Manuring roses* (Drouineau, Antibes). Surface spreading of the fertilizer and applications (1-1-2) with the fertilizer lance, were compared. For young roses with a superficial root system the fertilizer lance proved less favourable than ordinary methods, but in the case of fully grown and old plantings deep applications, especially of phosphates, were advantageous. (5) *Manuring apples with the fertilizer lance* (Herviaux, Quimper). In comparison with surface applications of NPK two applications with the fertilizer lance, the first before blooming and the second later in the season, reduced the number of fruits dropped (120 to 76) and increased (a) the number of healthy fruits (194 to 273), (b) yields (17 kg. to 31 kg.), and (c) the average weight per fruit (92 g. to 113 g.). The trial was carried out for one season on 4 trees for each of the two treatments. (6) *Mineral deficiencies in old and young vines* (Maume and Dulac, Montpellier). In the experimental field of the Montpellier Station a young vineyard did not show any symptoms of deficiency despite having received no fertilizer for 9 years, and having been planted on the site of an old vineyard, which had suffered severely from potassium deficiency. The explanation is that in old vines the ability to utilize nutrients deteriorates. The investigation also showed that soil analysis is not a reliable guide to the fertilizer needs of vines. (7) *Nitrogen manuring of potatoes* (G. Joret and H. Malterre, Amiens). Nitrogen applications at the rate of 400 g. nitrates and 400 g. ammonium per 100 m² increased average yields on the 3 soils mentioned under (2) by 24, 21 and 23% respectively. Nitrogen manuring is therefore considered profitable. (8) *Potassium manuring of potatoes* (G. Joret and H. Malterre, Amiens). Although alluvial soil, like lime and chalk soil, needs much potash for its fertility, it failed to respond to potash fertilizers in 3 out of 15 seasons. These particular summers were very wet, and it is suggested that the potassium leached out. (9) *Early detection of potassium deficiency in vines by means of leaf analysis* (L. Maume and J. Dulac, Montpellier). Vine foliage showing browning as a result of potash deficiency has a potassium content of less than 1% of the dry matter before flowering and often of less than 0.30% at harvest time, while in healthy vines it hardly ever drops below 1% and occasionally rises above 3%. Insidious cases of slow decline may be diagnosed as potassium deficiency by leaf analysis. (10) *Severe potassium deficiency in beans* (G. Barbier, Versailles). On a loam soil (0.009% exchangeable K₂O), not supplied with potash for 7 years, beans died at an early stage without forming seeds; an annual application of .60-75 kg. K₂O proved quite inadequate. (11) *Potassium absorption in vines and fruit trees* (L. Maume and J. Dulac, Montpellier). Figures for 8 years are given of the nutritional effect *e* (K₂O content of fertilized leaves : K₂O content of unfertilized controls) in vines produced by potash manuring, three analyses being made every year, viz. in May, July and September. In another series of experiments the values for *e* are given for apricot and plum trees, expressing the K₂O-ratio in leaves (a) from clean-cultivated trees and trees standing in sod and (b) from fertilized trees and controls. At the last of the 4 seasonal analyses clean cultivation showed a great advantage over sod culture, the *e*-value for plums being 2.6. In experiment (b) fertilized apricots showed an *e*-value of 2.4. Stem diameters of apricot and plum trees under clean cultivation were 7.5 and 7.4 cm., as compared with those of trees in sod of 5.5 and 4.9 cm. respectively. In the leaf analyses of vines and fruit trees the effect of potassium manuring was most pronounced towards the end of the season.

1990. PROULX, T. 634.1/7-1.8
La fertilisation du verger. (Orchard manuring.)
Rev. d'Oka, 1944, 18: 195-201.
While farmyard manure is hard to get, apples should be supplied a balanced 9-5-7 artificial manure at 700-800 lb./a. Symptoms of deficiency of N, P, K, Ca, Mg, B, Fe and Mn are described.—Montreal.
1991. WILCOX, J. C., HOY, B., AND PALMER, R. C. 634.11(711)-1.8
Orchard fertiliser tests in the Okanagan Valley.
Sci. Agric., 1947, 27: 116-29, bibl. 8.
Tests were made over 10 years in 5 apple orchards on 4 soil types and records taken of yields, size and colour of fruit, tree vigour, and soils data. N generally increased yield, P and K were without significant effect; colour, size, and biennial bearing were not consistently affected by fertilizers.—Summerland, B.C.
1992. MOREAU, L., VINET, E., AND SIMON, L. 631.8: 634.11 + 634.13
Observations sur la fertilisation des arbres fruitiers. (Applying fertilizers to fruit trees.)
C.R. Acad. Agric. Fr., 1942, 28: 592-4 [received 1947].
Results are presented of a trial in which different varieties of apple and pear were grown, some as untreated controls while others received a mixed NPK fertilizer, showing the relative increase in trunk circumference and weight of shoots. In general the apples responded more markedly and more rapidly than the pears. Of the twelve varieties under observation there were only two exceptions to this: the pear Colorée de Juillet and the apple Reinette du Mans.
1993. DICKSON, G. H. 634.11-1.55
A second report on the biennial bearing of a Baldwin orchard.
Sci. Agric., 1947, 27: 112-5, bibl. 5.
Repeated application of farm manure has to some extent reduced the biennial bearing habit of a Baldwin apple orchard.—Vineland, Ont.
1994. GOUËRE, A. 634.13-1.8
Essais de fumure de longue durée sur poirier Passe-Crassane. (Long-term manurial trials with the Passe-Crassane pear.)
Ann. agron. Paris, 1947, 17: 233-41.
The trials were started in 1937 in an orchard in Seine-et-Oise, the fruitgrowing area for the Paris market, on trees planted two years previously. On this good silt soil, surface applications of fertilizers had but little effect. However, NPK applications by the fertilizer lance increased yields within 3 years by about 20%, chiefly by increasing the weight of individual fruits rather than the number of fruits harvested. As a result of the treatment the trees kept their leaves longer in a functioning condition and dropped them later. The quantity of fertilizers supplied was based on average crops—25 tons per hectare—and the weight of prunings. Each tree received 6 injections per year totalling 250 cubic cm. or 3.3 cubic m. per hectare, which would be equivalent to a rainfall of 0.3 mm. The concentration of the solution was less than 20%, the actual amounts of fertilizer annually given to each tree being N, 69 g.; P₂O₅, 84 g.; K₂O, 126 g.
1995. DOTI, F. 634.25-1.8
Esigenze di concimazione del pesco nel periodo giovanile. (Nutrient requirements of the young peach.)
Riv. Frutticoltura, 1942, 6: 1-9, bibl. 8 [received 1947].
Trials in the sandy soil of the horticultural research station's gardens at Cornano near Milan indicate that nitrogen is the element most essential for growth in the first few years

of life of seedling peaches. Poultry manure [penna] was particularly successful.

1996. DOTTI, F. 634.25-1.8
Indagini sulla concimazione del pesco. (Investigations on the manuring of peaches.)
Riv. Frutticoltura, 1942, 6: 57-74, bibl. 29 [received 1947].

Peach manuring trials took place in the neighbourhood of Massolombarda and Lugo in the years 1937-41 with the varieties Triumph, Hale and others. They showed that the application of nitrogenous fertilizers in amounts between 4 and 8 quintals a hectare is beneficial. The immediate benefit is to growth, which in its turn favourably affects cropping the following year. Phosphatic manuring had no favourable effects.

1997. LIWERANT, J. 634.25-1.8
Contribution à l'étude de la fertilisation du pêcher. Note 1: Teneurs en azote, acide phosphorique et potasse des différentes parties du pêcher. (Manuring peach trees. I. Nitrogen, phosphoric acid and potash content of different parts of the tree.)
Ann. agron. Paris, 1947, 17: 226-32, bibl. 2.

For the last 20 years peach growing has developed steadily in south-western France, especially in the Garonne basin, which is surpassed only by the two largest French peach areas in the Rhone and Roussillon Valleys. In Haute-Garonne alone there were about 400,000 peach trees in 1944-45. In 1935 the Station Agronomique, Toulouse, started a manuring trial at Montgaug-sur-Save, Haute-Garonne, on Amsden peach trees planted the previous year, with the object of studying the nutrition of peaches by the wood analysis method of Vinet. According to this author the comparison of the total N+P+K content and of the N : P : K ratio in annual shoots of trees in good and poor production respectively would give a clue to the fertilizer needs of deficient trees. The present paper is chiefly concerned with the technique of sampling. Eventually, the desired reliability was achieved by comparing 10 cm. long pieces of de-budded annual shoots with a diameter, in the middle, of 4 mm. Since the bark proved to be the best indicator of nutritional status, only this tissue was used. As long as the period of complete rest in peaches is not more accurately determined, the samples will be taken early in winter, after leaf fall.

1998. FORDE, H. I., AND PROEBSTING, E. L. 634.75-1.84
Utilization of ammonia supplied to peaches and prunes at different seasons.
Hilgardia, 1945, 16: 411-25, bibl. 7 [received 1947].

Five years' data from trial plots in a Paloro peach orchard in California indicate that autumn was a slightly less favourable time for applying nitrogen than spring or winter and that a split application is not advantageous. Prunes in the same soil type (a Gridley loam) showed no increase in yield after 5 years of nitrogenous manuring. N applied as NH_3 in the irrigation water behaved essentially as $(\text{NH}_4)_2\text{SO}_4$. Nitrogen levels in the trees treated were higher than those in the controls. The time of application would appear to be relatively unimportant.

1999. COWART, F. F., AND SAVAGE, E. F. 634.25-1.84
The effect of nitrogen fertilization on yield and growth of Elberta peach trees.

Bull. Ga Exp. Stat. 253, 1947, pp. 16, bibl. 4.
This bulletin reports further observations on a trial of nitrogenous fertilizers against cold injury [see H.A., 13: 69]. Nitrogen applied at the rate of 0-48 lb. per tree, half in March, half in June, resulted in the most efficient tree growth and production; over ten seasons the yield of manured plots was 15% greater than that of the controls,

and the harvest a week later. Fruit colour was satisfactory, and fruit size was unaffected.

2000. McHATTON, T. H., AND OTHERS. 634.25-1.84+1.874
The response of peach trees to nitrogen and cover crops.

Bull. Univ. Ga, Ser. No. 912, 1946, pp. 15, bibl. 7.
Application of nitrate of soda in March and September, or in September only, increased the yield of Elberta peach trees growing on Cecil clay loam with a winter leguminous cover crop. Peach trees should be allowed to grow larger in Georgia. Yield is correlated positively with circumference and negatively with twig growth. Although there is a high positive correlation between the yields of sample trees and the groups they represent, the large amount of variation between trees within plots, apparently due to the use of seedling rootstocks, shows that asexual propagation of stocks is important.

2001. JOUIS, E. 631.831
Valeur fertilisante des cendres des bois de pommier et de poirier. (The fertilizing value of the wood ashes of apple and pear.)
C.R. Acad. Agric. Fr., 1942, 28: 549-51 [received 1947].

Data are tabulated showing the amounts of various nutrient elements obtained from the ash of twigs, bark and wood of a pear tree and an apple tree.

2002. KILPATRICK, D. T. 634.1/7-1.874
Orchard soil management to maintain fertility.

J. Dep. Agric. S. Aust., 1947, 50: 543-6.
Measures strongly recommended for maintaining soil fertility in orchards are, the avoidance of excessive cultivation and the correct treatment of green manure crops to build up the soil organic matter. Subterranean clover (*Trifolium subterraneum*) should prove invaluable in increasing fertility in depleted orchard soils and in controlling erosion; because of its free seeding this annual, when once established, needs no further seeding and can be treated as a perennial. It has recently been shown that fat hen (*Chenopodium album*) compares very favourably with legumes in its nitrogen content and in wet summers, when its cultivation would not seriously compete with the trees for moisture, it might be used to advantage.

2003. BOULD, C. 631.874: 634.11: 663.3
Cover crops in relation to soil fertility and tree nutrition. An experiment with bush cider trees. Progress report I.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 23-31.

During the first season of the experiment described cover crops and rootstocks had a significant effect on yield of fruit.

2004. (DAVIS, J. F.) 631.874: 634.25
An experiment with rye as a green manure.

Ill. Hort., 1946, Vol. 35, No. 3, 1½ pp.
From the results of trials in Delaware it is concluded that "a rye cover crop in a peach orchard should be fertilized with nitrogen in addition to the nitrogen applied for the trees".

2005. "LAGONDA." 634.1/8-1.874
Maintaining soil fertility on the M.I.A. [Murrumbidgee Irrigation Area].
Fruit World, Aust., 1947, 48: 6: 11, 15.

Twenty-five years of irrigation and cultivation have seriously affected the fertility of M.I.A. soils, as the declining tree vigour of new plantings and the increasing difficulty of irrigation control show. Improvement can be achieved by growing burr medic,* also known as burr trefoil and burr clover, as a winter green manure crop and by reducing

* *Medicago denticulata*.

tillage to an absolute minimum. However, these remedies will not restore fertility sufficiently to allow fresh plantings on old orchard sites. The only real cure is rotational horticulture, i.e. putting the land down to pasture for probably not less than 5 years, though this system is not easy to follow on small-size farms.

Noted.

2006.

- a ANON. 634.1/8(776)
Fruits recommended for planting in Minnesota, 1947.
Minn. Hort., 1947, 75: 27.
- b BODIN, R. A. 634.1/8(776)
Minnesota's fruit industry.
Minn. Hort., 1947, 75: 85.
- c BOUCHER, P. 631.564 + 658.8: 634/635
La récolte et la vente des fruits et des légumes. (Harvesting and marketing fruits and vegetables [in Quebec and Montreal].)
Rev. d'Oka, 1944, 18: 220-6; 1945, 19: 22-32, 86-94, 139-41.
- d ČERNENKO, S. F. 634.11: 575(47)
Apple breeding in connexion with the choice of initial forms. [Russian.]
Agrobiologija (Agrobiology), 1946, No. 2, pp. 97-110.
- e JENNY, H., AND OTHERS. 631.84
Comparative behavior of ammonia and ammonium salts in soils.
Hilgardia, 1945, 16: 427-57, bibl. 9.
- f McMUNN, R. L. 634.11(773)
Apple varieties on the market.
Ill. Hort., 1945, Vol. 34, No. 4, 2 pp.

- g McMUNN, R. L. 634.11(773)
Additional notes on apple varieties on the Chicago market.
Newsl. Ill. St. hort. Soc., 1946, No. 2, 1 p.
- h McMUNN, R. L. 634.25(773)
Peach varieties on the Chicago market.
Ill. Hort., 1946, Vol. 35, No. 1, 1 p.
- i MURNEEK, A. E., AND BAKER, H. H. 634.11: 631.564
Preparing apples for market and their sale.
Circ. Mo. agric. Exp. Stat. 295, 1944, pp. 20 [received 1947].
- j PEYRE, P. 634.63
Sur l'olivier. (The olive.)
Jouve et Cie, Paris, 1938, 270 pp., 60 fr., reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29: 90 [received 1946].
- k PEYRE, P. 634.21(44)*
Les abricotiers indigènes et exotiques. (Local and introduced apricots.)
Jouve et Cie, Paris, 1943, pp. 216, figs. 47, 130 fr., from review in *C.R. Acad. Agric. Fr.*, 1943, 29: 453-4 [received 1947].
- l SCHULTZ, J. H. 634.25(797)
Peach trees [in Washington State] appraised by College specialist.
Better Fruit, 1947, 41: 7: 21-5.
- m SIMON, L. 634.1/7(493 + 441.8)
Les vergers du Limbourg belge et de l'Anjou. (The orchards of Belgian Limbourg and Anjou.)
C.R. Acad. Agric. Fr., 1943, 29: 549-52, bibl. 2 [received 1946].
- n SWARTWOUT, H. G. 631.541 + 631.541.5
Propagation by grafting and budding.
Circ. Mo. agric. Exp. Stat. 241, 1942, pp. 11 [received 1947].

SMALL FRUITS, VINES AND NUTS.*

2007. BUTTERFIELD, H. M. 634.7(794)
Bush berry culture in California.
Circ. Calif. agric. Ext. Serv. 80, 1947, pp. 56, bibl. 10.

Chiefly *Rubus* spp. are dealt with in this revised circular. Since the earlier edition [*H.A.*, 4: 543] costs have increased considerably, but there is still a margin of profit for the berry grower.

2008. GUILLAUMIN, A. 588.13
Les Actinidia. (Actinidia.)
Fruits d'Outre-Mer, 1947, 2: 34-6, bibl. 34.

Most of this account of the genus is devoted to *A. chinensis*, the Chinese gooseberry. The vines are planted 5-6 m. apart and trained on wires or trellises; several female plants may be pollinated by one male, which may be grafted on a female. In pruning, branches that have fruited are removed, unless needed to build up the framework, and are replaced by long vigorous branches of one-year wood, which produce fruiting laterals. One plant may yield 100 kg. of fruit at the end of September or October [in Paris]; the fruit keeps well until February or March, and a single fruit provides the daily vitamin needs of an adult. Multiplication may be by seed or marcottage. The plant will stand a temperature of -30° C.

2009. HALL, J. W. 634.711 + 634.75
Raspberry and strawberry cultivation in Scotland.
Scot. Agric., 1946, 26: 53-60, bibl. 7.

During the last ten years the soft fruit acreage in Scotland has dropped considerably, strawberries by approximately one-half, raspberries by approximately one-third, and

currants and gooseberries by about one-sixth. The main cause for the decline of the first two crops is deterioration due to virus diseases, the Department of Agriculture having been unable to maintain the inspection of stocks under war conditions. The schemes for the inspection and certification of strawberry and raspberry fruiting plantations have now been resumed, and the grant of "stock-runner" certificates for strawberry runners propagated on the "block system" and "stock-cane" certificates for raspberry canes produced in "spawn-beds" has been newly introduced. With a requirement of over 14 million strawberry plants and over 7 million raspberry plants to bring the acreage up to the 1935 figure and with the supply of current British and export needs of disease-free stock, Scottish propagators should have good prospects. The "spawn-bed" or "cane nursery" method affords facilities for rearing all virus infected plants as they appear. The "spawn-bed" produces a plentiful supply of young canes from the second season onwards, its life being indefinite if the practice described are followed. The "block-system" of strawberry runner propagation is also discussed in detail.

2010. STRONG, W. J. 634.711-1.8
Fertilizer and organic matter studies with the Viking red raspberry.
Sci. Agric., 1947, 27: 341-53, bibl. 1.

Plots used in an earlier trial abandoned in 1935 [see *H.A.*, 6: 457] were again planted with raspberries in 1939. N was added annually to the appropriate plots, and P and K until soil analyses showed them to be abundant. Control plot of the earlier trial were dressed with farmyard manure, and in half the plots of each block chopped straw was ploughed under in the spring of the first four years and in the autumn

* See also 1897, 1986, 1989, 2658, 2805.

of the next two. Yields were generally increased by the application of straw in autumn and decreased by its application in spring. Plots treated with N only gave low yields; plots treated with manure gave high yields.—Vineland, Ontario.

2011. HARRIS, R. V. 634.711-2.8
Getting back virus-free Lloyd George.
Grower, 1947, 27: 251.

Virus-free stocks of Lloyd George raspberries have been successfully re-introduced into the United Kingdom from New Zealand.

2012. PORPÁČZY, A. 634.711-1.523
Málna-szedő nemesítési kísérletek. (Breeding raspberry × blackberry crosses.) [German summary ½ p.]
Bull. Hungarian Coll. Hort. Vit., 1944, 10: 143-5 [received 1947].

The author, after noting the results of crossing Lloyd George raspberry with *Rubus caesius*, gives an account of a successful cross made between the loganberry, *Rubus loganobaccus*, as mother plant and the F_2 generation of raspberry and blackberry cross—the reverse cross was unsuccessful. The F_2 generation of this combination gave a large number of useful types, which united the fruitfulness of the loganberry with the frost resistance of *R. pseudoidaeus*. He has named the type *Rubus mohácsyanus*.

2013. SCHÜTZ, F. 634.715-1.542
Schnittversuche an Brombeeren. (Sorte Theodor Reimers.) (Pruning trials with blackberries; variety Theodor Reimers.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 39-41.

A preliminary summer pruning trial with the vigorous blackberry variety Theodor Reimers indicates that cutting back all lateral shoots completely will result in the formation of comparatively few, very well-developed flower buds—the condition aimed at. The other treatments tested, cutting back to 3, 2 and 1 bud, failed to produce equally well developed flower buds and made a second pruning necessary, as the buds tended to grow out again. The trial continues, and frost resistance will be observed in the coming winter.—Wädenswil Research Station.

2014. CORBAZ, J. 634.722: 581.192
Examen de quelques variétés de groseilles à grappes et valeur alimentaire des petits fruits. (An analysis of the fruits of red currant varieties.)
Rev. hort. suisse, 1946, 19: 2-5.

Sugar content and acidity of the juice, "maturity coefficient", red colour intensity, taste and aroma were determined for 17 red currant varieties. The "maturity coefficient", which proved to be a direct measure of quality, was calculated by multiplying the sugar content of the juice by 20 and dividing the figure obtained by the acidity of the juice. In the best varieties it was a value above 100, viz. 135 in Perfection and 108 in Laxton's No. 1. Perfection was the only variety the juice of which could be consumed without sugar. Comments are made on a number of other varieties and several are recommended for general planting.

2015. DUFOUR, A. 634.722
Contribution à l'étude de quelques variétés de groseilliers à grappes. (A study of some currant varieties.)
Rev. hort. suisse, 1946, 19: 5-10.

Comments on a number of red and white currant varieties grown in French Switzerland.

2016. BOULD, C., AND CATLOW, E. 634.723-1.8
A manurial experiment on black currants.
Progress report I.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 31-6.

During the first season of this experiment to test the effect of certain organic manures the treatments had no effect on

growth or yield of fruit. During the second season significant differences were produced on growth and the K_2O , P_2O_5 and N content of leaves, but not on yield. The mineral status of the leaves was satisfactory except in the plots receiving stable manure and composts; these dressings did not liberate sufficient nitrogen to maintain a satisfactory nitrogen level. The results are tabulated.

2017. TOMUR, K., AND ARSAN, E. N. 634.23
Anadolu otu (*Vaccinium arctostaphylos* L.) nun özellikleri ve tanınması hakkında bazı tesbitler. (Bearberry leaves as a substitute for tea. Their recognition and difference from tea.) [English summary ½ p.]
İnhisarlar Tütün Enstitüsü Raporları, 1944, 3: 147-54, bibl. 14 [received 1947].

Bearberry leaves can be worked and given the appearance of real tea and were used as tea before the war. The sale of these leaves for tea is now forbidden in Turkey and the present paper shows by descriptions and drawings how the two may be distinguished.

2018. ANON. 634.75
A new strawberry variety.
Grower, 1947, 27: 465.

"Auchincruive Climax", a new dessert variety, resistant to red core, root rot and tolerant of viruses, is ready for distribution in Scotland.

2019. ROGERS, W. S. 634.75
Progress in strawberry culture.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 149-50.

Recent research and practical experience show the importance of treating runner raising as a special business; virus-sensitive varieties should be kept isolated from tolerants, and young from old plantings. The use of special stocks or once-grown special stock progeny is advocated. The trend of planting, as shown by acreages of certified runners of different varieties in cultivation, is discussed.

2020. ROGERS, W. S. 634.75-1.533
Developments in the isolated block system for raising strawberry runners.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 66-73, bibl. 6.

Three experiments comparing various designs and spacings of isolated blocks for strawberry propagation are described and illustrated by drawings. Usually the closer the spacing of parent plants the greater the runner yield per acre, but the smaller the yield per plant. For scarce stocks wide spacing is desirable and closer spacing for plentiful stocks. For most purposes double blocks comprising 6 plants are now recommended as this increases the percentage of ground occupied by the runners, and laying the later runners outside the parent plants to leave a minimum cultivated strip of 2 ft. wide is advocated. Suitable planting distances are 3 ft. × 3 ft. for Royal Sovereign M.40 in dry areas, and 4 ft. × 4 ft. in moist areas. The more vigorous Huxley M.44 commonly needs the wider spacing. The maximum size of block at present recommended is 10 ft. × 6 ft. The isolated block laying of runners, permitting effective inspection and roguing is an important part of the Special Stock Certificate system.

2021. GUADAGNIN, L. 634.75
O morangueiro e sua cultura. (Growing strawberries.)
Ceres, 1944, 5: 388-91.

Seed may be separated from crushed pulp by careful decantation; it germinates in 2-3 weeks and transplanting is possible after 2 months. A complete artificial manure should be applied 4 months after planting, and this should be repeated for the three years of cropping.

2022. SNYDER, J. C. 634.75
Rollers help set strawberry plants.
Better Fruit, 1947, 41: 10: 44.
Rolling of newly-planted strawberry plants with an 800-lb. roller at Mount Vernon, Washington, or even with tractor wheels, improved stands and reduced the numbers of missing plants.
2023. STEPHENS, S. E., AND JARDINE, F. L. 634.872
A grape variety trial at Charters Towers.
Qd agric. J., 1947, 64: 261-4.
An account of a trial of 13 varieties of *Vitis vinifera* grown in a district with mild winters, not ideally suited to grape-growing. Results indicate that Servant is the most reliable of the varieties tried.
2024. BRICHET, J. 634.873(65)
Vigne à raisin sec, "Sultanine" ou "Smyrne", en Algérie. (The Sultanine or Smyrna raisin in Algeria.)
Fruits et Prim., 1947, 17: 5-7.
This raisin grape grows well in parts of Algeria, on rupestris stocks, where it can be irrigated on good soils; success depends on hot, dry, sunny weather after harvest, and this rules out part of the littoral.
2025. MAGOON, C. A. 634.8(76/77)
Grapes for different regions.
Fmrs' Bull. U.S. Dep. Agric. 1936, 1943, pp. 38 [received 1947].
Vitis vinifera, or European grapes, are grown chiefly in California. The native bush grapes, i.e. *V. labrusca*, *riparia*, *aestivalis*, *rupestris*, *lincecumii*, *champini*, are grown more widely in the regions east of the Rockies and the Pacific North West; and lastly the so-called muscadine grapes *V. rotundifolia* and *V. munsoniana* are widely grown in the south. Descriptions are given of the most important varieties in all these classes with notes on where they are grown.
2026. JACOB, H. E. 634.87(794)
Grape growing in California.
Circ. Calif. agric. Ext. Serv. 116, 1947, pp. 83, bibl. 15.
California supplies 30% of the raisins, 15% of the table grapes and 2% of the wine consumed throughout the world. This revised circular is a complete guide to growing and harvesting in that State. Nearly all the varieties are *Vitis vinifera*. A few American varieties can be grown in the cooler valleys but their usefulness is restricted to home gardens and local markets.
2027. BLAHA, J. 634.8(438)
Nejdůležitější odrůdy révy vinné. (The most important varieties of grapes.)
Knihovna ústředního svazu vinařů, Brno, 1941, 16: 3: 1-79, 5 col. plates [received 1947].
This publication issued by the Czechoslovak Central Association of Grapegrowers, consists of descriptions of 15 varieties of grapes, under the headings: synonyms, origin, regions of cultivation, requirements and uses, description, time of ripening in relation to phenological data, training and pruning, compatibility, diseases and pests, yield, quality and chemical composition.
2028. LOREE, R. E. 634.84(774)
Effect of climate on the performance of grapes in Michigan: some 1945 observations.
Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 173-5.
In a climate similar to that prevailing at East Lansing early-maturing or short-season varieties are more dependable than Concord, which can, however, be grown safely further south in Michigan. The short-season varieties recommended are Van Buren and Fredonia blue grapes and Portland and Ontario green grapes.
2029. BRANAS, J. 634.835.094
Le problème des hybrides. (The problem of hybrid vines.)
Prog. agric. vitic., 1947, 127: 221-5, 279-84, 333-9.
A general discussion on the merits and disadvantages of the hybrid varieties of vine obtained by crossing American varieties with those generally cultivated in France, with an account of their distribution in France.
2030. DEPARDON, L., AND BURON, P. 634.835.094
Les hybrides producteurs directs de vigne dans la région du centre. (Direct-producers in central France.)
Ann. agron. Paris, 1946, 16: 413-22.
While it is not so difficult to introduce disease resistance into the hybrid vine, quality has been the great problem. However, the headway made in 15 years' breeding is considerable, as this review of the position shows. In respect of alcohol content, total acidity and dry extract the direct-producer wines are comparable with the traditional French wines. Their quality is judged yearly by a panel of competent tasters, and the verdict is that some of the new hybrids yield a commercially satisfactory wine of the "vin ordinaire" type. Moreover, on the list of hybrids recommended for trial planting in the vine region of central France are also six said to produce quality wine. The characters of the new seedlings, some of them white, are discussed.
2031. LEVADOUX, L. 634.8: 581.46
Étude de la fleur et de la sexualité chez la vigne. (A study of flower and sex in the vine.)
Ann. Éc. nat. Agric. Montpellier, 1946, 27: 1-90, bibl. 67.
The incidence of different floral types in the vine, and the composition of the flowers in these types are considered, and lists are given of the sex and types of flower found in some of the varieties grown in the Montpellier collections. The use which the breeder can make of these facts is discussed.
2032. MARTIN, W. R., JR., SWARTWOUT, H. G., AND CLARK, M. W. 634.8
Establishment and early management of the vineyard.
Circ. Mo. agric. Ext. Serv. 512, 1944, pp. 11 [received 1947].
The risk of late frosts in Missouri makes it advisable to choose elevated sites with good air drainage when laying out new vineyards. Concord has largely been used in the past, but several other table and wine grapes have been grown successfully. Contour planting, cultivation and trellising are discussed.
2033. BRICHET, J. 634.8(65)-1.541
La reconstitution du vignoble Nord-Africain et le greffage à la Mayorquine. (The rehabilitation of the vineyards of North Africa and the Mayorquin graft.)
Fruits et Prim., 1947, 17: 243-9.
As a result of neglect half the Algerian vineyards are due for replanting and nurserymen are unable to supply all the plants needed. The author suggests that growers should produce their own plants by the Mayorquin graft, and reprints a description of this method; photographs illustrate the account.
2034. AGNEL, H., AND GALET, P. 634.8-1.541.11
Les porte-greffes (ampélographie pratique). (Vine rootstocks—practical ampelography.)
Ann. Éc. nat. Agric. Montpellier, 1946, 27: 161-204, bibl. 7.
A full and clear guide and key to the determination of the vine rootstocks used in France and Algiers. They are the American vines *Vitis labrusca*, *V. riparia*, *V. rupestris*

V. berlandieri, *V. candicans*, *V. cordifolia* and their hybrids. It may be of interest to note that much the largest area devoted to vines in France on any particular rootstock is 528 ha. under *Rupestris* du Lot followed in descending order by 3309C, 41B, M et G, 161-49C., Riparia Gloire (129 ha.), and that 37 other rootstocks are used. In Algiers 41B has pride of place followed by *Rupestris* du Lot and 99R. The composition of the different hybrids cited is given.

2035. CAPUCCI, C. 634.8-1.535-1.67
Osservazioni sull'accrescimento delle barbatelle di vite in vivaio irriguo ed asciutto e sul successivo sviluppo nel primo anno di vita a dimora. (Notes on the growth of rooted vine cuttings in irrigated and unirrigated nurseries and on their removal elsewhere.)
Riv. Frutticoltura, 1942, 6: 18-28, bibl. 9 [received 1947].

Trials in the province of Bologna in 1939 on *Rupestris* du Lot rooted cuttings showed that under the conditions of the trial the percentage take and subsequent growth were superior in cuttings irrigated every 15 days to those in cuttings irrigated every 8 days or unirrigated.

2036. LAFON, J. 577.17: 634.8-1.535
Les phytohormones en viticulture. (The use of growth substances in viticulture.)
Rev. Vitic., 1947, 93: 138-44.
LEYVRAZ, H.
Les hormones végétales de synthèse et l'enracinement des portes-greffes. (Synthetic growth substances as an aid to the rooting of rootstock material.)
Bull. O.I.V., Avril 1947, abstr. in *Rev. Vitic.*, 1947, 93: 254.

A general discussion of the many possible uses of growth substances in horticulture is followed by an account of the great possibilities afforded by them to the vine nurseryman. Many of the trials described refer to the *Berlandieri* hybrid 41B grafted with a vinifera. They have proved on the whole somewhat inconclusive, inasmuch as, though rooting has been slightly increased in some cases, in others there has been little or no response. Methods used have been smearing with impregnated lanoline, soaking in solution and dipping in impregnated dust, the last proving much the most satisfactory from the point of view of the practical nurseryman. The lack of uniform success must be attributed to lack of precise knowledge of the correct dose and of the most favourable technique. This needs working out to suit each particular vine stock and the condition of that vine stock at the time. In the second paper are recorded the results of trials of growth substances on grafted *Riparia* × *Rupestris* 3,309 and *Riparia* × *Berlandieri* Teleki 5BB. They also are contradictory.

2037. CAPUCCI, C. 634.8-1.536
Quale è il momento più opportuno per effettuare la piantagione delle viti nell'Emilia. (The best time for planting out rooted cuttings of vine in Emilia.)
Riv. Frutticoltura, 1943, 7: 53-65, bibl. 16.

Three years' trials from October to May in the neighbourhood of Bologna with rooted cuttings of *Rupestris* du Lot and with rooted cuttings of 420A worked with Chasselas showed that the best subsequent growth ensued when planting out was done in November, namely at a time when the shoots were almost completely lignified and had lost most of their leaves.

2038. LEYVRAZ, H. 634.8-1.542
Le pincement ou écimage de la vigne. (Heading back vines.)
Rev. romande Agric. Vitic. 1945, 1, 7/8, pp. 4-6 [received 1947].

The importance of correctly heading back vine stocks is stressed. The first pinching out on adult vines should be done during the flowering period and a later one when the shoots are 50 to 80 cm. above the stakes.

2039. SHAULIS, N. 634.8-1.542
Heavy pruning and *Fredonia* yields.
Wis. Hort., 1947, 37: 155, from *Farm Res.*, 1947.

Irregular bearing by the *Fredonia* vine led to an experiment, started in 1942, to compare Chautauqua, Umbrella Kniffen, 4 cane and 6 cane Kniffen systems of training, and pruning levels leaving 28, 38 and 48 buds for vines with 2 lb. prunings. With the least fruiting wood the yield was 2½ tons/acre, with the intermediate pruning it was 3½ tons and with the lightest 4½ tons. The yield data for 1945 and 1946 were of the same order and only in the Chautauqua system was cluster size increased by the longer pruning. Longer pruning of vigorous vines is recommended.

2040. VINET, E. 634.8-1.8
Sur la valeur des caractères conférés à la vigne par la fumure. (The importance of the characters induced in the vine by manuring.)
C.R. Acad. Agric. Fr., 1941, 27: 301-6 [received 1947].

Reference is made to a former note (*C.R. Acad. Agric. Fr.*, 1939, 25: 894-902) where it was shown that morphological and physiological characters conferred on a vine by manures could be fixed by grafting. Graft sticks were taken from vines that had received during 5 years various fertilizers in which the variable element was potash (as chloride or sulphate) and it was found that the grafts had retained, in part at least, physiological characters induced by the fertilizers, as indicated by the potash content of the shoots. The present paper continues the observations and records the increases (over controls) in weights of shoots, their diameter and the length of their basal internodes (except the first), taken from vines derived from graft sticks that had received the various potash treatments while on the mother vine.

2041. VINET, E. 634.8-1.8
Sur les effets de la fumure au cours du temps: suspension et reprise de fumure sur la vigne. (Manurial trials with vines.)
C.R. Acad. Agric. Fr., 1941, 27: 904-15 [received 1947].

A study of the NPK requirements of the vine. The formula of equilibrium for these elements is not constant but varies with the variety and the product aimed at. A formula of equilibrium $N: P_2O_5: K_2O = 1: 2: 5$ in one case produced vines with satisfactory growth and yield; increasing the potash did not give any better results. Another formula $N: P_2O_5: K_2O = 1: 3: 1: 3$ resulted in excessive vigour.

2042. DE BOIXO, —. 634.8: 581.144
Mesure des accroissements des feuilles et des rameaux de vignes. (Measuring growth of vine leaves and shoots.)
Prog. agric. vitic., 1947, 127: 305-10, 344-8, 367-70.

Measuring increments of leaves and shoots during the growing season is advocated for scientists as a foundation for studying the effect of manures and as a guide to the application of fungicides. Data obtained by the author are expressed in tables or as graphs.

2043. BODDY, H. 634.8-1.67
Sprinkling grapes.
Better Fruit, 1947, 41: 11: 22.

Sprinkler irrigation was tested in Washington vineyards and gave promising results.

2044. LACOMBE, R. 634.8-1.53
Le tracteur vigneron. (Tractors for vine-growers.)
Prog. agric. vitic., 1947, 128: 13-21, 74-9, 103-8.
Various types of motor tractor for use in vineyards are described and illustrated.
2045. GLENN, E. M., HATTON, R. G., AND WITT, A. W. 634.51(42)
Some preliminary investigations on the growing of walnuts in England (1925-46).
J. roy. hort. Soc., 1947, 72: 269-74, bibl. 8.
The following aspects are dealt with: The case for selecting and propagating by grafting varieties of walnuts suitable to English climatic conditions. The method of propagation and subsequent cultural treatments. The importance of late leafing, of early catkin-bearing varieties, of pollination, and of well-filled and well-sealed shells. A list of the most promising varieties under test, and instructions for picking, harvesting, bleaching and storing. The chief diseases and their control. [Authors' summary.]
2046. GLENN, E. M. 634.51(42)
Growing walnuts in England.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 160-4.
The propagation (grafting and patch budding), cultivation (soil and site, planting, training and pruning and manuring), growth and crop (time of leafing out, pollination, cropping), varieties, harvesting and storing, diseases and pests of the walnut are outlined, with a note on *Juglans regia* and *J. nigra* as timber trees.
2047. CHEVALIER, A. 634.51(44)
Sur le noyer noir d'Amérique et sur sa culture et son utilisation en France. (The black walnut and its cultivation in France.)
C.R. Acad. Agric. Fr., 1941, 27: 207-9 [received 1947].
A plea for growing the black walnut (*Juglans nigra*) because of its vigour and disease resistance, in France, particularly for the oil obtained from the nuts [see *H.A.*, 17: 2737].
2048. BECKER, J., AND MALIGA, P. 634.51(439.1)
Néhány hazai dió értékeröl és minősítéséről. (The value of some Hungarian walnut varieties.) [Hungarian, German summary 1 p.]
Bull. Hungarian Coll. Hort. Vit., 1944, 10: 86-93 [received 1947].
Tests of 27 samples of Hungarian walnuts led to the conclusion that the size of the fruit is generally inversely proportional to the amount of kernel, i.e. medium and small fruits show a higher kernel-shell ratio than large fruits without any decrease in oil or protein content. Oil and protein contents vary inversely with each other. The recommendation is made that only such varieties shall be propagated as fulfil the following conditions: (1) Nut weight 10-15 g., diameter at least 30 mm. (2) Kernel at least 50% of nut. (3) Oil content of kernel at least 60%. (4) Oil and protein content at least 40 kg. per 100 kg. of whole nuts.
2049. RIERA, F. J. 634.51-1.541.11
La multiplicación de nogal. (Propagation of the walnut.)
An. Esc. Peritos agric. Barcelona, 1944, 4: 321-30 [received 1947].
A summarized report of a congress held at Grenoble in 1936 and published here* as of possible interest to Spanish growers and nurserymen. Rootstocks that might be used for the European walnut (*Juglans regia*) are mentioned and their advantages and disadvantages noted. Varieties of
- J. regia* are ideal rootstocks in virgin soil free from *Armillaria mellea*. *J. nigra* is resistant to rootrot and so can be used as a rootstock in soils where there is risk of infection by *Armillaria*. Treyves' method of grafting walnuts is described.
2050. HAMMAR, H. E., AND HUNTER, J. H. 634.521
Some physical and chemical changes in the composition of pecan nuts during kernel filling.
Plant Physiol., 1946, 21: 476-91, bibl. 23.
Dry weight, ash, oil, protein-N, P, K, Ca and Mg were determined in kernels, shucks, and shells of samples of pecan nuts at 9 weekly intervals from an early filling stage to full maturity. Shuck and shell developed early, and most of the kernel filling took place in the early weeks. The shuck was particularly rich in K, which is thought to be concerned with translocation or transformation of materials stored in the kernel. The main mineral constituent of the shell was Ca.—Albany, Ga.
2051. ILIEV, I. 634.54(497.2)
Hazelnut investigations in Bulgaria. [Bulgarian, summary in German 1½ pp.]
Bull. Minist. Agric. State Fruit Res. Stat. Drenovo 5, 1944, 72 pp., bibl. 13 [received 1947].
This bulletin describes observations on bushes of a number of hazelnut varieties (*Corylus avellana*) introduced into the Drenovo fruit research station from Germany and Italy in 1933. The data recorded were obtained in 1937-9 and relate to such characters as time of blossoming and ripening, fruit size, thickness of shell, weight of kernel, oil content and susceptibility to frost damage of the different varieties. The variety with largest nuts was New Giant (24×20×19 mm.). The kernels were mostly 40-45% of the weight, but varied according to the variety from 32-84 to 54%. There were six varieties with shells less than 1 mm. in thickness, the rest 1 to 1.5 mm.; there was no variety with shell thicker than 1.5 mm. The oil-content varied from 57-90 to 66-99%, five varieties having more than 64%. Some of the characters described are illustrated in 16 figures.
2052. PASQUIER, M. 634.551(611)
Notes sur l'amandier en Tunisie. (The almond in Tunisia.)
Fruits et Prim., 1947, 16: 332-3.
In addition to the standard American varieties, Non-pareil and Peerless, introduced in 1932, several Italian varieties are well suited to the north, and there are local varieties selected around Sfax, which flourish in the south of Tunisia. Notes are given on propagation, planting and spraying.
2053. BAKER, G. A., AND BROOKS, R. M. 634.55-1.542.27
Effects of fruit thinning on almond fruits and seeds.
Bot. Gaz., 1947, 108: 350-6, bibl. 3.
Two degrees of thinning were applied, viz. (1) one largest fruit per spur left, and (2) as before, but remaining fruits separated by at least 6 in.; on the Nonpareil tree used the numbers of leaves per fruit left were 18 and 58 respectively. The development of these fruits was followed throughout the season, and the growth of new wood was weighed at harvest. Thinning increased the average weight and uniformity of the seeds, and made them longer and broader, but flatter. Thinning also increased the growth of new wood.—Davis, Calif.
2054. LENGLEN, —. 634.58(44)
A propos de la culture de l'arachide. (Ground-nut culture [in France].)
C.R. Acad. Agric. Fr., 1940, 26: 193-204 [received 1947].
A historical survey of the introduction, distribution and culture of the ground-nut in France.

* Original in French, published at Grenoble, Dep. d'Agric. de l'Isère.

2055. a DOUARCHE, L. 634.8+663.25
La vigne et le vin. (Vines and wine making.)
Editions Belle France, Paris, reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29: 145-7 [received 1946].
- b LEYVRAZ, H. 634.8+63(494.4)
Reconstitution du vignoble romand et choix des porte-greffes. (Choice of rootstocks in the rehabilitation of the vineyards of French Switzerland.)
Publ. Stat. féd. Ess. vitic. arboric. Lausanne, 1946, 344, pp. 7.
- c McMUNN, R. L. 634.75(773)
Report of the strawberry variety survey.
Ill. Hort., 1947, Vol. 36, No. 1, $\frac{1}{2}$ page.
97.5% under Blakemore.
- d PEYRE, P., AND SCHÉHADÉ, H. 634.55(44)
Les amandiers indigènes et exotiques. (Native French almonds and introduced varieties.)
Jouve et Cie, Paris, 1941, 278 pp., 32 figs., reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29: 90 [received 1946].
- e PEYRE, P., AND LANCOSME, E. 634.51
Les noyers indigènes et exotiques. (French and exotic nut trees [Juglans and Carya].)
Jouve et Cie, Paris, 1941, pp. 247, 180 fr., reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29: 214 [received 1947].
- f PEYRE, P. 634.54
Les noisetiers et coudriers. (Hazel nuts.)
Jouve et Cie, Paris, 1943, pp. 162, figs. 22, 90 fr. and
Les marronniers indigènes et exotiques. (Native French chestnuts and introduced varieties.)
Jouve et Cie, Paris, 1943, pp. 225, figs. 27, 130 fr. Reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29: 453-4 [received 1947].
- g REBOUR, H. 634.75(61)
La sélection du fraisier. (Selecting strawberries in N. Africa.)
Fruits et Prim., 1946, 16: 104-5.
- h REBOUR, H. 634.851(611)
Les cépages indigènes en Tunisie. (The native grapes of Tunisia.)
Fruits et Prim., 1947, 17: 171-3.
- i ROY, N. 634.8(495)
La viticulture en Grèce. (Viticulture in Greece.)
Prog. agric. vitic., 1947, 127: 228-33, 264-7.
- j VARMA, S. S. R. 634.847(545)
A decade of performance of seven leading varieties of American grapes in Patiala Hill territories.
Punjab Fruit J., 1947, 11: 233-5.
- k WOOD, M. N. 634.55(794)
Almond culture in California.
Circ. Calif. agric. Ext. Serv. 103, 1947, pp. 87, bibl. 47.
Revision of 1937 issue, see *H.A.*, 8: 71.
2056. PAINTER, A. C. 631.55: 634.11+634.13
Failure of apple and pear trees to crop.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 154-6.
The commoner causes of failure of apple and pear trees to crop in gardens are discussed: (a) where the tree blossoms but fails to crop, and (b) where the tree produces little or no blossom.
2057. WALLACE, T. 632.19
Recent developments in methods of diagnosing mineral deficiencies of crops.
J. roy. agric. Soc., 1946, 107: 122-33, bibl. 23.
The illustrated review includes a discussion of mineral deficiencies in vegetables and fruit trees. "No one method [of diagnosis] will solve all problems, but each has its particular uses, and the most effective procedure is to use a combination of the different methods in a complementary way and in confirmatory rôles." In the author's opinion "the methods now available provide the means of detecting deficiencies of any of the mineral elements at present known to be essential to the nutrition of crops".
2058. WALLACE, T. 632.19
Mineral deficiencies in plants.
Endeavour, 1946, 5: 58-64, bibl. 8.
A brief account backed by 12 excellent coloured plates of the symptoms induced in certain agricultural and fruit plants by the lack of particular mineral elements. The author discusses the localities and soil conditions in Great Britain where the various deficiencies most prevalently occur, dealing thus with N, P, Ca, Mg, K, Na, Cl, Fe, Mn, and B. He suggests how their incidence is normally overcome. He points out that deficiencies of S, Zn, Cu, Mb, though important in many crops abroad, have not been recorded in any field crop in Great Britain.
2059. BARBIER, G. 632.19
Sur les carences minérales des végétaux. (Compte rendu d'une mission en Angleterre.) (Mineral deficiencies of plants. Report of a visit to England.)
Ann. agron. Paris, 1946, 16: 476-84, bibl. 1.
East Malling, Long Ashton and Rothamsted Research Stations were visited, and the methods used there for diagnosing and curing mineral deficiencies are discussed.
2060. HEWITT, E. J. 632.19: 578.084
A technique for large scale pot sand cultures.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 37-43, bibl. 22.
A bitumen paint lining is an effective treatment for pots used in experiments with deficiencies of major elements and of iron, manganese and boron. Polythene is promising as an alternative material for work with trace element deficiencies. Sand for trace element experiments is purified by steam and a mixture of hydrochloric and oxalic acids. An automatic apparatus for the treatment of large batches is described. Unpurified rainwater collected from a glass roof and stored in bitumen-painted tanks is suitable for experiments with major element and boron deficiencies. Synthetic resin ion-exchange methods of water purification greatly extend the scope of experiments that can be carried out with rain water. Such purified rain water compares favourably with water from tinned copper stills, and equipment for continuous purification is described. [From author's summary.]
2061. RAMAMOORTHY, B., AND DESAI, S. V. 632.19
Preliminary studies of the nutritional diseases of plants and their spectroscopic diagnosis.
Ind. J. agric. Sci., 1946, 16: 103-11, bibl. 16.
Some minor-element deficiency diseases of tobacco, wheat, barley, citrus and betelnut occurring in India are recorded. In all these cases the deficiencies were found to be associated with an excess of some other element. Depending on the

* See also 1872, 1907d, 1989, 1999, 2240, 2273.

extent of this excess, deficiencies of one or more elements occurred giving a wide range of deficiency symptoms. It was found that the spectrochemical analysis of the affected soils and plants in comparison with their healthy counterparts provided an insight into both the element in excess and the secondary deficiencies. The spectrochemical diagnosis could be successfully used for correcting these diseases. [From authors' summary.]

2062. LEVY, B. F. G. 634.1/2-1.8

Tree injection. I. The estimation of dosage in relation to tree size.

A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 99-103, bibl. 3.

From data recorded it is concluded that the maximum safe dose for fruit trees was approximately 0.5 gm. of salt (potassium phosphate 0.25 gm., potassium sulphate 0.125 gm., urea 0.125 gm., water 100 c.c.) per sq. cm. of cross sectional area and that this could be used as a basis for estimation of dosage in the field. Recommendations are given for the practical application of the method.

2063. LEVY, B. F. G. 634.1/2-1.8

Tree injection. II. Methods for overcoming resistance to absorption of liquids.

A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 104-6, bibl. 1.

Sometimes trees will not absorb liquid when injection is attempted. Methods of overcoming this difficulty are (1) raising the reservoir to give a head of pressure, (2) using a force pump, or (3) using the pump followed by injection in the normal way. No. 3 is recommended for bush trees. A method is described for measuring the rate of absorption during injection.

2064. LEVY, B. F. G. 634.11-1.83-2.19

Tree injection. III. Re-invigoration of debilitated trees.

A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 107-12, bibl. 5.

Duchess Favourite apple trees severely affected by potassium deficiency were injected in midsummer with a "complete" nutrient rich in potassium. In the next summer, incipient fruit buds were stimulated into vegetative growth. In the next spring, on the treated trees there were decreases in the proportion of fruit to wood buds, in die-back, in "ghost blossoms", and later in leaf scorch. No increases in extension growth of cropping were detectable. It is concluded that benefit can be derived from midsummer injections for potash-starved trees. [Author's summary.]

2065. LEVY, B. F. G. 632.19: 634.11

Preliminary experiments on the injection of individual apple fruits on the trees.

J. Pomol., 1947, 23: 134-6, bibl. 2.

Individual apple fruits, while still on the tree, were injected with dye solutions. Injection through the cut end of a leafy shoot arising near the base of a bourse bearing a fruit resulted in total permeation of that fruit. Injection through a secondary shoot arising on the same bourse as the fruit resulted in the permeation of one or two sectors of the fruit only. These methods should be useful in the study of physiological disorders in trees in the field.—East Malling Research Station.

2066. ROBERTS, W. O., AND LANDAU, N. 632.19: 634.11

Multiple mineral deficiencies in fruit trees: injection as a first aid treatment.

J. Pomol., 1947, 23: 80-91, bibl. 6.

Solid injection was used experimentally to combat serious die-back in apple trees due to deficiency of potassium and one or both of the trace elements, manganese and iron. The symptoms preceding die-back were (1) chlorosis of the leaves at the tips of extension shoots, suggesting iron

deficiency, (2) interveinal chlorosis of spur leaves, suggesting manganese deficiency, (3) marginal leaf scorch, suggesting potassium deficiency. Injecting the necessary nutrients improved foliage colour and increased the potassium content of the leaves. Injection of the deficient trace element alone seemed to raise the potassium content of the leaves, and the trace element plus potassium induced a greater increase in potassium than the injection of a potassium salt alone. Injections of manganese salts alone or combined with a potassium salt increased the manganese content of the leaf.—East Malling Research Station and Essex War Agricultural Committee.

2067. COOPER, P. S. 551.566.1: 631.589

Plant injections for diagnostic and curative purposes.

E. Afr. agr. J., 1947, 13: 37-53, bibl. 13.

The use of the hypodermic syringe for plant injections in the diagnosis of mineral deficiencies in plants is described and details are given of the apparatus and chemical solutions used. A description is given of the methods of injection used with some tropical and non-tropical plants. The symptoms attributed to various deficiencies are outlined. A short note is given on tablet injection methods. Reference is made to the injection technique in the control of mosaic virus in cassava.

2068. CIFERRI, R. 634.25-2.19

Ulteriori esperienze ed osservazioni sulla "Rosetta" del pesco nell'Albese. (Further observations on peach rosette in northern Italy.) *Bull. R. Staz. Pat. veg. Roma, 1941, 21: 133-56, bibl. 41 [received 1947].*

Temporary rosette symptoms were observed in certain young peach trees planted in ground from which old peach trees had recently been removed and an attempt was made to find the cause or causes. While no definite conclusions are reached, except that the malady was not due to lack of copper, manganese, boron or zinc, or to faulty budding or grafting, possible factors such as the toxic principles of the preceding plants, faulty soil treatment, etc., are discussed at some length.

2069. BARTHELET, J., AND DROUINEAU, G. 634.1/7-2.19

La culture fruitière dans les sols calcaires. (Fruit growing in soils rich in lime.)

C.R. Acad. Agric. Fr., 1943, 29: 539-41, bibl. 4 [received 1947].

The injection of iron salts to counteract lime-induced chlorosis is not practicable, nor is its action fully understood. The authors suggest that the proper approach is by extensive rootstock trials, combined with biochemical tests.—Antibes.

2070. GALET, P. 634.8-1.541.11-2.8

Résistance des porte-greffes à la chlorose. (The resistance of rootstocks to chlorosis.)

Prog. agric. vitic., 1947, 128: 128-33, bibl. 4.

The American varieties of grapevine and their hybrids, though resistant to phylloxera, are more subject to chlorosis in various degrees than the European varieties. The present paper describes a technique for determining the degree of tolerance of different varieties to the lime content of the soil.

2071. LEVY, B. F. G. 634.11-2.19: 546.27

Suspected boron deficiency in apples in Britain.

A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 95-8, bibl. 10.

Injection of Northern Spy apple trees with boric acid and with a NPK mixture had no effect on the incidence of bitter pit, but boric acid treatment did reduce the severity of another kind of spotting. In this case the symptoms were necrotic dark brown areas beneath the skin, but not in contact with it, sometimes down to 4 mm. below the skin; their diameter was 1-2 mm. They were mainly

between the equator and the calyx, sometimes scattered all round the circumference and sometimes localized in groups in an area of 2 or 3 sq. cm. There were no symptoms visible on the surface. It is suggested that this disorder is of the "cork" class and results from boron deficiency.

2072. GROVES, A. B. 634.1/2: 632.1
Weather injuries to fruits and fruit trees.
Bull. Va agric. Exp. Stat. 390, 1946, pp. 39, pl. 14.

A well illustrated description of damage due to weather in Virginia, incurred chiefly by apples.

2073. P[OULTER], R. M. 632.111
Where to build your house.
Weather, 1947, 2: 111.

A report of a lecture by Professor David Brunt, who recommended that long grass be removed from orchards and gardens to enable them to escape frost damage, and that square, walled gardens on sloping ground should be orientated at 45° to the slope so that the upper walls would divert cold air flowing down the hill.

2074. MANLEY, G. 551.524.36: 551.588
Variations in the length of the frost-free season.
Quart. J. roy. met. Soc., 1946, 72: 180-4, bibl. 5.

In the U.K., choice of site will add weeks of freedom from frost, by lengthening the "active growing season".

2075. BERNON, G. 634.8-2.111
Les gelées d'hiver de janvier 1947. (Winter frosts in January 1947.)
Prog. agric. vitic., 1947, 127: 258-64.

An account of the damage caused to vines in France during the severe frosts early in 1947. The low temperatures on the morning of 28 January appear to have caused most severe damage. The degree of damage in any one region depended on the ripening of the wood, time of pruning—the damage was most evident near the pruning wounds—and vigour of plant, the young vigorous vines, with less ripened wood, being more susceptible to damage than the older ones. The European varieties (*Vitis vinifera*) were more sensitive to frost than the American varieties; thus rootstocks were unharmed when the scions were killed. There were differences in degree of damage according to latitude. A map shows the minimum temperatures at various places in France between 9 p.m. 27 January and 9 a.m. 28 January.

2076. MARSAIS, P. 632.111
Le mesure de la température des organes végétaux dans ses rapports avec la lutte contre les gelées. (The measurement of the temperature of parts of plants in relation to frost control.)
C.R. Acad. Agric. Fr., 1943, 29: 412-6 [received 1947].

A double moving coil meter, with two crossed and mutually fixed coils, has one coil fed through a resistor of low temperature coefficient (magnanin) and the second through a resistance wire of high temperature coefficient (nickel). In practice, two elements were used to measure air temperature at 40 cm. and two were wound round vines, and four curves traced by a recording thermometer; the temperature of the vine buds was always below that of the air, usually by 2° C. on nights when radiation occurred. For protection, a bimetallic thermometer was arranged to ignite two smoke generators when the critical temperature was reached. During the course of this experiment, on only one occasion, at 4 a.m., the low temperature operated the generators; the temperature rose 3° C. over a radius of 40 m. during the first hour, remained steady for the next hour, and then fell until sunrise.—Institut National Agronomique, Vitry.

2077. DAVISON, J. R. 632.111: 634.1/7
Orchard heating to prevent frost damage.
Agric. Gaz. N.S.W., 1947, 58: 254-8, 299, 302, 357-60.

The causes of frost, the movements of the air leading to

frosts, with reference to "inversion" and "ceiling", the principles of orchard heating, the influence of cultural practice on the incidence of frost, and the equipment used in trials at Yenda, are described. Data obtained on two farms where orchard heating was attempted are given. It is doubtful whether heating vines is economically sound in that particular area, but time has proved that heating apricots is worth while—and also peaches, although their later blossoming and setting make them less susceptible than apricots.

2078. SHAW, R. A., AND REDLICH, F. 632.111
Preliminary trials of a fan for the protection of trees and other crops from frost.
Rep. Coun. sci. industr. Res. Aust., Div. Aeronautics, A.45, 1946, pp. 18, illustrated.

In the laboratory a horizontal fan one diameter above the floor drew its main airflow from a height of several diameters and spread it radially in a shallow stream. Two field trials under frost conditions were made in the spring of 1946, one in a citrus orchard with a 12 ft. fan, the other in a frost pocket of a vineyard with a 21 ft. diameter horizontal fan. Results indicate that the larger unit may cover 3 acres effectively, and that 3 horse-power per acre may be sufficient to ensure a rise in temperature of 2° F. in certain frost conditions. The tests will be continued.

2079. MODLIBOWSKA, I. 634.11-2.111
"Green Blotch", an abnormal tissue of apple fruits, probably associated with spring frost.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 62-5, bibl. 4.

Green blotches at the calyx end of apple fruits of many varieties, particularly Ellison's Orange, seen in the autumn of 1945 and 1946, resembled somewhat the symptoms of frost injury described by Rose *et al.* (*U.S. Dep. Agric. Misc. Publ.* 168, 1933). Below the blotches were cracks filled with spongy tissue consisting of thick hyaline-walled, elongated cells with large air spaces. The possible origin of green blotch and its relation to low temperature is discussed.

2080. TALBERT, T. J. 634.25-2.111
Handling peach trees after winter killing of fruit buds.
Circ. Mo. agric. Exp. Stat. 221, 1942, pp. 7 [received 1947].

When temperatures of -10° to -12° F. occur, it is advisable to prune peach trees at, or soon after, blossom time; the loss of flower buds is then evident, and the amount of thinning and heading back can be regulated to the size of crop expected. After more severe frosts it is advisable to delay pruning for a season, applying nitrogen to help recovery.

2081. BRIERLEY, W. G. 634.711-2.111
Raspberry fields at Duluth need winter protection.
Minn. Hort., 1946, 74: 115-6.

In several years' experiments at Duluth, Minn., winter injury in unprotected raspberry canes ranged from 40 to 60%. In tip-covered canes injury averaged 2-3%, while complete covering gave 100% protection. Under Minnesota conditions tip and complete covering may be carried out any time in October. Covering the tip only gives commercially satisfactory control and must be regarded as a profitable operation.

2082. SCHELLENBERG, A. 634.8-2.111
Winterkälteschäden im Weinbau. (Winter injury of vines.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 92-5.

In the winter of 1946/47 the observation has been re-confirmed that -17° C. must be regarded as a critical temperature and that the well-developed main buds of thick shoots are most susceptible to frost injury. In the canton of

Zurich the practice of lowering the vines to the ground and covering them with manure or similar material has been introduced. In many cases the vines are lowered but not covered in the hope that snow will give sufficient protection. Rootstock and scion are adapted to this operation by suitable treatment which is not specified. It is only mentioned that the scion has a bare stem of a length of 40-50 cm.

2083. PEYER, E. 634.8-2.111
Selbsterstellung von Stroh-Frostschuttschirmen. (Home manufacture of straw covers for the frost protection of vines.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 101-2.

For a description of the straw cover, which has again afforded good protection to vines against spring frosts, see *ibid.*, 1945, 54: 280-1; *H.A.*, 15: 1560. A simple apparatus for making these screens at home is illustrated.

2084. LEYVRAZ, H. 634.8: 632.111
Protection de la vigne contre le gel. (Protecting the vine against frost.)
Publ. Stat. féd. Ess. vitic. arboric. Lausanne 345, 1946, pp. 24.

Late pruning appears to offer possibilities, though it reduces the sugar content of the fruits, and exhausts the vine if practised continuously. In the canton of Geneva the frosts of 1945 led to the complete failure of the crop on crown and cordon trained vines, whereas those pruned on the Guyot system (with short fruiting branches) produced 30-40% of a normal crop. Sprays of strong calcium sulphide or white oil, applied at the end of March, delay growth, but in 1945 the delay was insufficient. Artificial heat and temporary protection with paper or straw covers have been ineffective at Pully.

2085. LEYVRAZ, H. 634.8-2.111
Le vigne après le gel. (Vines after frost.)
Rev. romande Agric. Vitic. 1945, 1: 6: 5-6
[received 1947].

Frosts on 1 and 3 May, 1945, caused severe damage in Swiss vineyards. Immediately afterwards the growers were advised, by radio and in the press, on the first measures to be taken. In the vineyards totally frozen or those in which all the shoots were killed to the base, nothing useful can be done and the plants must be left to recover naturally, if recovery is possible. On the other hand where branches are frozen in parts, disbudding the affected portions is recommended so as to stimulate latent buds to grow out, and cutting back shoots nearly to the base is advised. When the new shoots have grown out for 15 or 20 cm. further judicious disbudding should be carried out so as to build up a set of branches to bear the next year's crop. Photographs show the types of damage caused and the appearance of a vine stock after disbudding.

2086. D., E. 632.13: 656.7
L'avion contre la grêle. (The aeroplane used against hailstorms.)
Prog. agric. vitic., 1947, 128: 84-5.

The author quotes General Ruby who, at a meeting of the Lyons Geographical Society, described his method of using aeroplanes in combating hailstorms, with particular reference to the protection of vineyards in the Rhone valley. The movements of air currents resulting in the formation of hail are described. The method does not aim at including the whole hail cloud, which may extend for many kilometres, but only at cutting the base, one or two kilometres across, of the ascending currents which form the whirlwinds carrying hail. Guns on the ground can do this. Bombarding the storm clouds from aeroplanes is useless, since these cannot reach the more inaccessible lower parts of the clouds where the hailstones are forming. The function of the aeroplanes in practice is to reconnoitre to mark the progress of the storm and to warn the regions in danger, either by telephone or by red rockets, so that guns can direct rockets

so as to strike the ascending hail whirlwind which is clearly visible as a white or yellowish band across the grey of the storm cloud. Trials were carried out with promising results between 1936 and 1939; they lapsed during the war, but were resumed in 1944 and 1945 with success.

2087. DE VILLIERS, G. D. B. 634.1/2-1.55: 581.036.5
Winter temperature and fruit yield.

Fmg. S. Afr., 1947, 22: 638-44 and 670, bibl. 2.

The subjects of delayed foliation and low yields of deciduous fruits in the western Cape Province 'due to insufficient winter chilling are discussed. The relationship between low winter temperature and high yield of pears is illustrated, the correlation coefficient being -0.60. The chilling requirements of apples, pears, peaches, plums, apricots and almonds are discussed. Those of an average apple variety are given as a mean temperature of less than 48° F. for at least 2 months. The article ends with a brief climatological survey of the winter temperatures of the principal fruit-producing areas in the western Cape Province, the most favoured area for deciduous fruit in South Africa.

2088. DE VILLIERS, G. D. B. 634.25: 632.112
Ultra-violet radiation as a cause of injury to peach twigs and its measurement by means of a cadmium photo-electric cell. [Summary in Afrikaans.]
Sci. Bull. S. Afr. Dep. Agric. 245, 1946, being *Fruit Res. tech. Ser.* 5, pp. 14, bibl. 8.

A form of injury to peach twigs accompanied by a dark, reddish-black discoloration, and in severe cases by splitting of bark and exudation of gum, was investigated. Carefully conducted experiments with glass of different wavelength transmission and other observations show that this type of winter injury to peach twigs was induced by intense ultra-violet radiation between 3,200° A. and $\pm 2,900^\circ$ A. of the sun's spectrum. Observations suggest that the injury is especially severe after winters of low maximum temperatures high humidity and moderate sunshine, followed by a sudden change in climatic conditions accompanied by increased ultra-violet intensity. With the object of correlating damage to peach twigs with intensity of ultra-violet radiation, measurements of ultra-violet intensity were carried out at Stellenbosch, from July to December 1937, with a cadmium photo-electric cell sensitive to wavelengths below 3,200° A. The intensity of ultra-violet radiation below 3,200° A. was found to increase by approximately 200 times from July to December. Humidity appears to have some effect on ultra-violet intensity. [From author's summary.]

2089. HOHLOV, S. S. 632.184
Secondary flowering of fruit trees and other unusual manifestations by plants in the vicinity of a gaseous bore near Saratov. [Russian.]
Sovetsk. Bot., 1947, 15: 36-8.

For about 18 days—until 25 August—spray and gas was driven out of the bore hole and swept over the neighbouring orchards and gardens. The gas consisted mostly of CH_4 , and the mineralized water contained compounds of Cl, SO_2 , Ca, Mg, and Br. The leaves, and even some twigs and branches, began to die. Pears suffered the least; and the leaves of sugar and table beet were surprisingly resistant to the scorching effect of the mineral and gaseous shower. By 25 August, the apples were in full bloom (except the most damaged); but only one pear tree—and that the most damaged—bloomed a little. The cause of these phenomena among the fruit trees and beet plants is discussed.

2090. HUTTON, K. E. 634.1: 632.19
Bitter pit of pome fruits.
Agric. Gaz. N.S.W., 1947, 58: 205-8.

The symptoms of bitter pit are described and illustrated and the author's recommendations for control are (1) Prune lightly; for susceptible varieties the system of pruning adopted should aim at producing a regular crop of evenly distributed fruit. (2) Provide drainage where necessary.

(3) Conserve moisture by the suppression of excessive weed growth during dry periods. (4) Avoid manuring during the growing period and irrigation when the fruit is approaching maturity, in order to maintain an even growth rate. (5) In varieties which are particularly susceptible, delay picking so that tree pit will have time to show up, and the fruit will be sufficiently mature to control the development of storage pit.

2091. LOTT, T. B. 634.23-2.19
"Small bitter cherry", a fruit abnormality of the Bing cherry variety.

Sci. Agric., 1947, 27: 260-2, bibl. 1.

Eight Bing trees in five orchards have produced "small bitter cherries", the name proposed to avoid confusion with "little cherry", a serious virus disease [*H.A.*, 17: 660]. Normal fruit may be borne on the affected tree. Small bitter cherry has not been transmitted by tissue grafts, and natural spread, if it occurs at all, is very slow.—Okanagan Valley, B.C.

2092. SELMAN, I. W. 632.8
The growth of the plant in relation to the incidence of virus infection. A survey of the literature. *J. Pomol.*, 1947, 23: 50-62, bibl. 78.

A survey of the literature pertaining to the relationship between incidence of virus disease and environment is presented. The field problem is considered under three heads: (a) Symptom suppression; (b) Animal vectors and the control of virus disease in the field; (c) The resistance of the plant to virus infection. It is pointed out that little critical work has been done on the problem of growing plants capable of resisting virus infection under field conditions, or on the parallel problem of growing plants that are relatively immune from insect attack. Evidence is adduced which strongly indicates that studies on these lines may offer a fruitful approach to the problem of virus disease control in the field.—Experiment and Research Station, Cheshunt, Herts.

2093. LACKEY, C. F. 632.8
Tissue relationships of certain dodders to some host plants used in virus disease studies. Abstr. in *Phytopathology*, 1947, 37: 362.

Three dodders have been used in transmission studies on certain host plants of virus diseases, viz. *Cuscuta californica*, a very small dodder; *C. subinclusa*, a larger one; and *C. americana*, the largest of the three.

2094. BLODGETT, E. C. 634.22-2.8
Sparse leaf of Italian prune. Abstr. in *Phytopathology*, 1947, 37: 360.

Trees affected with this disease showed a delay in blooming and leafing, sparse foliage, and marked reduction in fruitfulness. Bud inoculation tests indicate that it is bud perpetuated, but to date there is no proof of transmission.

2095. ZELLER, S. M., MILBRATH, J. A., AND KIENHOLZ, J. R. 634.23-2.8
Black canker of cherry. Abstr. in *Phytopathology*, 1947, 37: 366.

Cankers of Napoleon sweet cherry in Oregon start in one-year-old twigs, first as slightly swollen areas in which the bark splits lengthwise and the swellings later grow into rough black cankers. Transmission of the disease was brought about by graft inoculation after two years.

2096. BONNEMAISON, L. 632.8: 634.711
Sur une maladie à virus du framboisier et son mode de transmission. (A virus disease of the raspberry and its transmission.) *C.R. Acad. Agric. Fr.*, 1944, 30: 294-6, bibl. 4 [received 1947].

The symptoms of the disease described as seen at the end of March were a slight shrivelling of the terminal leaves and irregular yellow spots. Affected leaves were from one-third to a quarter the size of normal leaves. Early in May

brownish necrotic zones, rounded or elongate, appeared between the veins of the older leaves. The disease became less noticeable during hot weather. In August the affected canes were conspicuous by their small size and wrinkling and hardening of the leaves. A comparison is made between this disease and raspberry virus diseases in America. The disease can be transmitted mechanically by rubbing sap from diseased leaves on leaves of healthy canes. The insect vector is found to be *Aphis idaei* V. de Goot.

2097. HARRIS, R. V. 632.8: 634.711+634.75
A review of some recent research on virus diseases of raspberry and strawberry in Great Britain. *A.R. East Malling Res. Stat. for 1946*, A30, 1947, pp. 113-7, bibl. 14.

The cause of degeneration of strawberry and raspberry varieties in Great Britain during the last 25 years is attributed to virus diseases. An account is given of the investigations on these diseases.

2098. SEVERIN, H. H. P. 634.8-2.8
Transmission of virus of Pierce's grapevine disease by spittle insects. Abstr. in *Phytopathology*, 1947, 37: 364.

Four species and 6 varieties belonging to 3 genera of spittle insects are vectors of the virus of Pierce's grapevine disease.

2099. OTT, J. 577.17: 632.8: 634.8
Hormones et "court-noué". (Hormones and court-noué.) *Fruits et Prim.*, 1946, 16: 289.

The author points out that the symptoms of court-noué in vines have much in common with the effects of selective herbicides of the hormone type; he calls for a central direction of research on this disorder of the grape vine.

2100. NYSTERAKIS, FR. 634.8-2.8
"Court-noué" et *Phylloxera vitifolii*. (Court noué and phylloxera.) *Rev. Vitic.*, 1947, 93: 9-12, bibl. 30.

The author points out that symptoms of court-noué have appeared in places where phylloxera is unknown and that there is no case for supposing that where phylloxera and court-noué are both present phylloxera is a vector or at any rate the sole vector. His tentative theory is that the pathogenic principles of court-noué find refuge in soil micro-organisms.

2101. BOURDIOL, —, HUMBERT, —, AND EMON, J. 634.8-2.8
Reconstitution des vignes "court-nouées". (Rehabilitation of vines suffering from court-noué.) *Rev. Vitic.*, 1947, 93: 201-2.

In the opinion of the authors, two of whom are working at Valence d'Agen (Tarn et Garonne, France) and one in the Oran district of N. Africa, "court-noué" is neither a virus nor a phenomenon due to nutritional deficiency, nor is it due to microbial infection. It is simply a radio-cellular mutilation, a type of mutation which causes malformation and degeneration and is due to regional climatic features." They define it as "a mutation which arises in a cell, then a group of cells showing mutilated chromosomes with sometimes total or partial incapacity to allow the formation of chloroplasts, a mutation which takes place in a bud, then a group of buds during formation". They compare it in different stages with witches' broom in cacao and rosette in groundnut. They note that some varieties are resistant, and that some can be cured. They make suggestions for reconstituting affected vineyards based largely on the use of resistant varieties.

2102. STOUT, G. L., AND WILSON, E. E. 634.55-2.8
Studies of a bud failure condition in almond trees. Abstr. in *Phytopathology*, 1947, 37: 364.

The chief character of this disorder in almonds is the failure of many buds to live and develop into new growth. It often results in a peculiar type of twig and limb development

and in disorderly arrangement of twigs and branches, suggesting the term "crazy top". Buds and scions from affected Nonpareil and Peerless trees failed to transmit the disorder to normal Nonpareil, Peerless and Drake trees, but a high percentage of buds and scions from Nonpareil and Peerless perpetuated it. A bud failure of Drake has been transmitted with scions to Nonpareil. This suggests that the disorder in Drake may be different from that in Nonpareil and Peerless.

2103. HUTTON, K. E. 634.23-2.3/4
Diseases of cherries.

Agric. Gaz. N.S.W., 1947, 58: 369-73.

Notes, with illustrations, on the diagnosis and control of brown rot (*Sclerotinia fructicola*), shot hole (*Clasterosporium carpophilum*), rust (*Puccinia pruni-spinosae*), bacterial canker (*Pseudomonas cerasi* var. *prunicola*), crown gall (*Agrobacterium tumefaciens*), wood rots, *Armillaria* root rot, waterlogging, sunscald and other gumming, and decline.

2104. DEMAREE, J. B. 634.73-2.3
A proliferating gall on blueberry plants caused by an *Actinomyces*.

Abstr. in Phytopathology, 1947, 37: 438.

A fungus tentatively identified as an *Actinomyces* causes tumefaction often accompanied by bud proliferation at or near the primary node of blueberry plants.

2105. RYŽKOVA, A. S. 632.3: 632.951
Bactericidal activity of hexachlorocyclohexane.
[Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947, No. 3, pp. 16-8.

666 has no bactericidal properties and is useless against bacterial and fungal diseases of plants. Its use against soil pests does not affect the microflora of the soil; it does not prevent the development of nodules on leguminous plants and is not harmful to *Azotobacter* in the soil.

2106. GREGORY, P. H. 581.14
The dispersion of air-borne spores.
Trans. Brit. mycol. Soc., 1945, 28: 26-72.

The factors which control the scattering of air plankton are reviewed and observed gradients of deposition are discussed with special reference to fungi causing diseases of plants. The significance for plant hygiene of the interpretation given of fungus spore dispersal is that, while attention should be paid to isolation, chief emphasis should be placed on eliminating foci of disease within a crop.

2107. KEITT, G. W., AND MOORE, J. D. 634.11-2.42
Apple scab control experiments with ground and tree spraying for 1946.*
Wis. Hort., 1947, 37: 147-8.

Elgetol or Krenite applied as a ground spray at the rate of 600 gal./acre, dilution 1: 200, reduced ascospore discharge by 96-5%; small scale tests of the former at double strength gave an indicated reduction of 99%, and two normal strength sprays a week apart gave 99.4%. Good control was obtained in ground-sprayed orchards, without serious injury to leaves or fruit, by applying lime-sulphur before bloom and milder sprays thereafter.—Wisconsin.

2108. PETCH, C. E. 632.952: 634.11
Fungicide spraying experiments, Rougemont 1946.
A.R. Pomol. Fruit Growing Soc. Prov. Quebec, 1946, pp. 29-35.

It appears that there are elemental sulphurs that can replace lime-sulphur completely as preventives of apple scab, and their use results in an annual crop increase of $\pm 25\%$ over lime-sulphur-sprayed trees. The crop increase is obtained without sacrificing bud or terminal growth. The average size of apples sprayed with elemental sulphurs is smaller than that of those sprayed with lime-sulphur. There is

very little foliage injury when elemental sulphurs are used as compared to the leaves sprayed with lime-sulphur. [From author's conclusions.]

2109. GERBALDI, C. 634.11-2.42
Prove di lotta contro la ticchiolatura del melo con miscela a freddo di calce e zolfo. (Tests on the control of scab by lime and sulphur mixed cold.)
Riv. Frutticoltura, 1941, 5: 133-42 [received 1947].

The mixture is more adhesive than lime-sulphur, does not damage the leaves and gives good promise of adequate control of apple scab.

2110. LOUW, A. J. 634.11-2.48
Fusicladium of apples.
Fmg. S. Afr., 1947, 22: 679-83.

The conclusion is reached that no uniform policy for the control of *Fusicladium* (black-spot) can be laid down to cover all circumstances. It is necessary, therefore, for the grower to get to know his environment and trees and to put the prescribed spraying programme into practice as circumstances dictate. A list of 18 apple varieties is given, classified according to their susceptibility to *Fusicladium*.

2111. VIENNOT-BOURGIN, G. 634.2-2.4
Les tavelures des arbres fruitiers à noyaux.
(Scabs of stone fruits.)
Fruits d'Outre-Mer, 1947, 2: 170-8, bibl. 30.

A study of systematics and biology of scab diseases, particularly as affecting peaches, apricots, plums and almonds, with control measures.

2112. BRYNER, W. 634.13-2.4
Krebswunden in spitzen Astwinkeln. (Canker wounds in the acute angles of pear branches.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 22-4.

Too acute angles of branches favour the development of canker in pears, an observation which is illustrated by three photographs. The surgical treatment of young cankers is described.

2113. ENGLISH, H. 634.23-2.4
Powdery mildew on cherry fruit in Washington.
Phytopathology, 1947, 37: 421-4.

In powdery mildew of cherry (*Podosphaera oxycantha*), the lesions on the fruit are circular, or more frequently irregular, due to the coalescence of two or more. A thin white mantle of hyphae radiating from the centre of young lesions covers the infected portions and gives the fruit a decidedly dull appearance. Older lesions are reddish-brown with skin tougher than that of healthy strains. The most heavily affected trees were rather closely planted and the tips of some heavily laden branches rested on the ground. Choke cherries in the vicinity bear a morphologically similar mildew and are a possible source of infection.

2114. GAUDINEAU, M., AND HUGER, R. 634.25-2.4
Lutte contre la cloque du pêcher et économie de cuivre. (Control of peach leaf curl with economy in copper.)
C.R. Acad. Agric. Fr., 1943, 29: 530-3, bibl. 1 [received 1947].

Sprays of commercial calcium or barium polysulphides (3%) were almost as effective as 2% bordeaux mixture in controlling peach leaf curl.

2115. MANARESI, A. 634.25-2.42
Un raro e grave attacco parassitario sui frutti del pesco. (The peach leaf curl fungus *Taphrina deformans* on peach fruits.)
Mem. Accad. Sci. Ist. Bologna 1943/44, ser. X, 1: 147-9 [received 1947].

Possibly as a result of the lack of adequate copper fungicides *Taphrina deformans* was found attacking fruits of the peach

* See also H.A., 16: 154 and 1367.

varieties Hale and Elberta but not those of Mayflower, Amisden and S. Anna, in the Province of Bologna in 1943 and 1944. In severe cases the fruits were badly malformed and discoloured and the kernels were small and misshapen.

2116. MOESZ, G. 634.725-2.4
Az egresnek egy újabb gombabetegsége. (A new gooseberry disease.) [Hungarian, German summary 3 pp.]
Bull. Hungarian Coll. Hort. Vit., 1944, 10: 80-6 [received 1947].

Description of a disease found on gooseberry due to a fungus identified by its pycnidia as *Microdiplodia ribicola*.

2117. MARSAIS, P. 634.8-2.4
Nouvelles formules anti-mildiou à employer en 1943. (New formulae for use against vine downy mildew in 1943.)
C.R. Acad. Agric. Fr., 1942, 28: 615-7 [received 1947].

The scarcity of copper sulphate and the necessity of economy in its use for spraying vines are emphasized. From trials mentioned the author advocates mixing copper sulphate with either iron sulphate or permanganate of potash in preparing sprays for vines. With these mixtures the amount of copper per hectolitre can be reduced below that in bordeaux mixture and still be efficacious.

2118. GALLAY, R., STAEHELIN, M., AND TRIVELLI, G. 634.8-2.4
La lutte contre le mildiou de la vigne. Les divers types de bouillies cupriques. (Controlling vine mildew. The various kinds of copper sprays.)
Rev. romande Agric. Vitic. 1945, 1: 11: 3-5 [received 1947].

An account is given of trials in which the action of cuprous oxide (under a trade name Sandox) and of copper oxychloride was compared with that of bordeaux mixture against vine mildew (*Plasmopara viticola*). All gave good control, the best being with bordeaux mixture 1% and Sandox 0.4%.

2119. LAFON, R. 634.8-2.4
Comment combattre l'oidium sans soufre ni permanganate. (How to control powdery mildew without sulphur or permanganate.)
C.R. Acad. Agric. Fr., 1944, 30: 215-20 [received 1947].

In discussing the use of copper sprays against vine powdery mildew, when sulphur is unobtainable, the following conclusions are drawn: (1) The efficacy of sulphur is confirmed; a mixture of sublimed sulphur and sodium carbonate proved to be satisfactory but inferior to pure sublimed sulphur. (2) Colloidal sulphurs used at the rates advised by the manufacturers were unsatisfactory. (3) Lime-sulphur (three applications) was unsatisfactory, even with the addition of 0.2 kg. of copper sulphate per hectolitre and a wetter. (4) Permanganate of potash at 0.12 kg. per hectolitre (one application) showed the usual temporary check, but repeated applications were necessary for satisfactory control. (5) Bordeaux mixture 1% with 200 g. of sulphonated terpene alcohol per hectolitre applied once was sufficient in some vineyards, in others a second application was necessary.

2120. REICHERT, I., AND OTHERS. 634.8-2.421.1
Trials for the control of powdery mildew of wine and dessert grapes in 1943-1945.
Bull. Rehovot agric. Res. Stat. 38, 1946, 4 pp.

Sulphur dusting against the vine powdery mildew [*Uncinula necator*] gave in general more reliable results than various sulphur sprays. Adding 30% lime dust to the sulphur did not reduce its efficacy but a mixture containing 50% lime was less favourable. On wine grapes the first application should be delayed until the flowering period even if the

disease has already appeared on the leaves. On dessert grapes sulphur dust first applied 1-6 days after the appearance of disease on the leaves equalled the effect of prophylactic applications. Applications at intervals of 12-14 days were successful even under conditions of severe infection, when treatments at longer intervals were sometimes less effective. Sulphuring resulted in very high percentages of dessert fruit fit for marketing and greatly increased the weight of wine grapes.

2121. DU PLESSIS, S. J. 634.8: 632.421.1
Powdery mildew of the vine and its control.
Sci. Bull. S. Afr. Dep. Agric. 238, 1944, 20 pp., bibl. 117, 3d. [received 1947].

In South Africa the effect of powdery mildew (*Uncinula necator*) on the fruit is of great importance, but on shoots and leaves it is generally unimportant. Observations show that relatively warm and humid conditions particularly favour its occurrence, i.e. when the temperature exceeds 60° F. and relative humidities are above 70%. The berries are particularly susceptible prior to their change of colour; their resistance to the disease was found to increase noticeably from the time that they change colour and start to soften. Sulphur applied three times during spring and early summer proved distinctly superior to bordeaux mixture, Verderame and copper sulphur dust. Lime, when 33% was added, had a deleterious effect on the toxicity of sulphur. If a sulphur has the requisite fineness and dusting qualities it is unnecessary to use highly refined and expensive proprietary products. A dust with 90% sulphur content is sufficiently effective.—Western Province Fruit Research Institute, Stellenbosch.

2122. BLUMER, S., AND PEYER, E. 634.8-2.4
Versuche zur Bekämpfung der *Peronospora* im Weinbau. (The control of downy mildew in vines.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 62-7.

Now that the saving of copper has ceased to be a primary consideration in disease control the effectiveness of certain fungicides against downy mildew of vine has again been compared with that of bordeaux mixture. It was found that spraying with cuprous oxide or copper oxychloride required more frequent applications than the use of bordeaux to achieve effective control. In weather favourable to mildew, only bordeaux proved capable of keeping the disease out of the vineyard. Bordeaux mixture was also shown to be the quickest and safest means of checking an infection already in existence. In the beginning of the season, however, 0.4-0.5% cuprous oxide should be given preference to 0.5-1% bordeaux mixture, since at that time the organic fungicide gives adequate protection without scorching the young foliage.—Wädenswil Research Station.

2123. HUBER, H. 634.8-2.952
Spritbrühverbrauch. (Spray consumption.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 77.

Average figures are given, separately for 8 annual applications, of the amounts of bordeaux mixture used at Wädenswil in the control of downy mildew of vines during the period 1941-46.

2124. HEWITT, W. B. 634.8-2.4
Sodium arsenite, a promising control of dead-arm of grapes.
Abstr. in Phytopathology, 1947, 37: 362.

Sodium arsenite solution containing an equivalent of 3 lb. arsenic trioxide per 100 gal. water was sprayed on grape vines infested with *Cryptosporella viticola* during dormancy, not earlier than 3 weeks after pruning, with good results.

2125. BLUMER, S. 634.8-2.482
Versuche zur Bekämpfung der Graufäule (*Botrytis cinerea*). (The control of *Botrytis cinerea* in vines.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 51-61.

After reviewing the literature on the subject the author describes his own experiments aiming at the control of *Botrytis cinerea* rot of grapes with organic fungicides. In laboratory tests the oxychinolin preparation, Tumex, gave very satisfactory results, but in field trials the thiuram preparations, Organol and Pomarsol, proved superior. While *Botrytis* infection could be reduced to about one-third, it was found that at the same time the much more dangerous *Penicillium* infection increased about five times. The explanation is that *Botrytis* is more potent in the grape than *Penicillium* and prevents the latter from developing by means of very active growth and the secretion of an antibiotic. Since the fungicides used are ineffective against *Penicillium*, at least at the concentrations tested, the balance is disturbed and *Penicillium* has the field to itself. A solution of the problem has not yet been found. Full data are given.

2126. STAEBELIN, M. 634.8-2.4
Le rougeot. (The rougeot disease of vines.)
Rev. romande Agric. Vitic., 1946, 1: 4-34
[received 1947].

Reference is made to recent severe outbreaks (particularly in 1944) of rougeot of vines [*Pseudopeziza tracheiphila*] in Switzerland. The biology of the disease and the conditions favouring epidemics are described. Good control was obtained with two applications of 1% or 1½% bordeaux mixture.

2127. GALLAY, R., STAEBELIN, M., AND WÜRGLER, W. 634.8-2.4
Le rougeot menace-t-il le vignoble romande ?
(Does rougeot menace vine culture in French Switzerland ?)
Rev. romande Agric. Vitic. 1945, 1: 9: 3-5.

Further reference is made to the damage caused by rougeot [*Pseudopeziza tracheiphila*] in Swiss vineyards (see above, No. 2126). Many vineyards were visited and the relative number of leaves infected in the various districts estimated. The best control was obtained with 2% bordeaux mixture.

2128. HADORN, C. 634.8-2.4
Peut-on combattre avec succès une épidémie de rougeot parasitaire dans nos vignobles ? (Is control of a heavy attack of rougeot possible ?)
Rev. Vitic., 1947, 93: 195-200, 231-6, bibl. 6.

Attempts to control roter brenner by various substances in 1945 and 1946 are described. In 1945 neither Cuivre-Sandoz (a proprietary cuprous oxide) at 0.5, 0.6 or 0.8% concentration nor bordeaux mixture at 2% proved entirely satisfactory. However in 1946 the combination of Cuivre-Sandoz (0.4%) + Thiovit, a wettable sulphur in suspension (1% before and 0.75% after flowering) gave excellent control even of very severe attacks. The phenomena observed during treatment are noted, and practical instructions are given for applying the control.

2129. MOORE, M. H. 634.54-2.4
Preliminary report on *Monilia fructigena* and *Botrytis cinerea* as wound parasites of cobnuts and filberts.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 120-1, bibl. 2.

Inoculation experiments on cobnuts with *Monilia fructigena* (H.A., 14: 584) and *Botrytis cinerea* showed these fungi to be wound parasites of nuts, and suggest that natural infection takes place through the oviposition punctures of the nut weevil, *Balaninus nucum*.

2130. WILSON, E. E. 634.51-2.4
The branch wilt of Persian walnut trees and its cause.
Hilgardia, 1947, 17: 413-30, bibl. 8.

This disease has become a major one in recent years amongst certain walnut varieties in parts of California. The disease

is described and the name *Exosporina fawcetti* n. sp. is proposed for the causative fungus.

2131. MAGEE, C. J. 632.4: 634/635
Sclerotium stem rot caused by *Sclerotium rolfsii*.
Agric. Gaz. N.S.W., 1947, 58: 265-6.

Sclerotium rolfsii, a very well-known plant pathogen in tropical and subtropical countries, is becoming increasingly widespread in farms and gardens in New South Wales where it has been recorded attacking a wide range of hosts including flowers, certain vegetables, also potato, tomato and tobacco, as well as apple, citrus, and peach stocks. The fungus attacks the stem near soil level producing first a layer of white mycelium and later brown spherical sclerotia. Affected plants are nearly always killed. Diseased plants should be burnt. On land known to be infested with sclerotia the liberal use of sulphate of ammonia (4-5 cwt. per acre) has been claimed in other countries to reduce losses, and rotation with cereals is advisable.

2132. MASSEE, A. M. 632.6/7
Notes on some interesting insects observed in 1946.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 124-8.

Notes are given on 21 insect pests and mites observed in 1946 and reference is made to the lethal effect of DDT on certain beneficial carabid beetles. Ladybird beetles were scarce in 1946.

2133. ANON. 632.963
Ladybird beetles (*Coccinellidae*).
Agric. Gaz. N.S.W., 1947, 58: 379-81.

With the exception of one injurious group, viz. the leaf-eating ladybirds belonging to the genus *Epilachna*, practically all the members of this family—which in Australia contains more than 250 different species—are beneficial insects.

2134. MILLS, H. B., HITCHCOCK, O. B., AND SCHMIEDES-KAMP, R. 632.7(786)
Montana insect pests 1945 and 1946. Thirty-first report of the state entomologist.
Bull. Mont. agric. Exp. Sta. 442, 1947, 22 pp.

This report deals with co-operative large-scale insect control programmes, the status of the more important or unusual insect control problems, and newly introduced pests. The chief problem was the control of grasshoppers—four species of *Melanoplus*. Other important pests included pea weevil (*Bruchus pisorum*) and asparagus beetle (*Crioceris asparagi*).

2135. JENKINS, L. 634.11: 632.7
Control of apple insects.
Circ. Mo. agric. Exp. Stat. 291, 1944, pp. 15
[received 1947].

Thirty-eight pests of apple trees are mentioned with descriptions of the injury they cause and of their control, and illustrated with 21 photographs. Notes on spray combinations include the following. Dormant oils may be used when the trees are dormant and until the buds start to open; they may cause severe injury if applied just before a frost or after growth is too far advanced. Summer oil is often used at a concentration of ½ to 1% as a spreader and sticker for lead arsenate and for fixed nicotine. An oil spray should not follow a sulphur spray sooner than 10 days. Fixed nicotine should never be used in combination with lime, since lime releases the nicotine too rapidly. Arsenical injury to foliage will be reduced if a "safener" of either ½ lb. copper sulphate and 1 lb. lime is added as a bordeaux, or a zinc bordeaux of 1 lb. lime and 1 lb. zinc sulphate is added to each 100 gal. of lead arsenate spray, starting in the second cover spray or about a month after the petals have fallen. Safeners may cause russetting of the fruit if used too early in the season.

2136. SMITH, W. W. 634.75(778): 632.7
Strawberry insects and their control in Missouri.
Bull. Mo. agric. Exp. Stat. 463, 1943, 22 pp.,
 bibl. 10.
 About 20 strawberry pests are grouped in relation to the
 organs attacked, viz. roots and crown, foliage and bloom,
 young fruit, ripe fruit. Their control is discussed.
2137. TAYLOR, A. L., AND MCBETH, C. W. 634.25-2.651.3
**The effect of soil fumigation on growth and yield
 of peach trees.**
Abstr. in Phytopathology, 1947, 37: 437.
 Peach trees, planted in sites treated with chloropicrin or
 with D-D (dichloropropene and dichloropropane) to
 control root-knot nematodes, had significantly larger trunk
 diameters after two years than those planted in untreated
 sites.
2138. COLE, L. W. L., AND HEELEY, W. 632.654.2: 577.17
**Growth substances plus white oil for red spider
 control.**
Grower, 1946, 26: 526-7.
 Occasionally summer white oil, sprayed to control the
 fruit tree red spider (*Oligonychus ulmi* C. L. Koch) may
 cause leaf and fruit drop on certain apple varieties. The
 possibility of reducing this risk by the addition of α -naphtha-
 leneacetic acid plus spreader (as for pre-harvest drop sprays)
 to the white oil has been tested for three seasons in various
 parts of England, using proprietary preparations. In one
 orchard of Cox's Orange Pippins leaf fall occurred 14 days,
 and fruitlet fall 21 days, after spraying with white oil only;
 only 6 fruits per tree survived to harvest. Fifty-two
 matured on trees sprayed with oil + hormones, and 44 on
 unsprayed trees which were heavily attacked by red spider.
2139. MCDANIEL, J. C. 632.654.2
Red mite control.
Wis. Hort., 1947, 38: 7.
 A report from the *Tennessee Horticulturist* that hexaethyl
 tetraphosphate [HET] sprayed on apples and plums killed
 crawling red mites without affecting eggs.
2140. MASSEE, A. M. 634.11-2.654.2
**A new method of rearing the fruit tree red spider
 (*Oligonychus ulmi* Koch) on apple seedlings.**
A.R. East Malling Res. Stat. for 1946, A30, 1947,
 pp. 122-3, bibl. 1.
 Rearing the fruit tree red spider (*Oligonychus ulmi* Koch)
 on apple seedlings in pots has proved useful for biological
 tests of acaricides on the eggs, immature forms and adult
 stages of the mite.
2141. ROUSSEL, R. 634.8-2.728
**Lutte contre les éphippigiers. (The control of
 ephippiger grasshoppers.)**
Prog. agric. vitic., 1947, 127: 352-3.
 Serious damage to vines by *Ephippiger bitterensis* in southern
 France is reported. The larvae destroy the young buds
 and then migrate to grasses. The adults return to the vines
 and attack leaves and fruit. Against the larvae dusting
 with H.C.H. preparations or applying an arsenic spray may
 be done at this stage. Poison baits containing sodium
 arsenate or H.C.H. are recommended against the adults.
2142. WOODSIDE, A. M. 634.25: 632.754
**Some insects that cause cat-facing and dimpling
 of peaches in Virginia.**
Bull. Va agric. Exp. Stat. 389, 1946, 13 pp.
 Peach growers in Virginia have suffered heavy loss from
 scarring (cat-facing) and dimpling or puckering of the
 fruits. The brown stinkbug (*Euschistus servus*), a smaller
 brown stinkbug (*E. tristigmus*), the tarnished plant bug
 (*Lygus oblineatus*), and the plum curculio (*Conotrachelus*
- nemaphar*) are the chief causes of cat-facing, and the green
 stinkbug (*Acrosternum hilare*) causes most of the dimpling.
 Clean culture and the alternate use of legumes and non-
 legumes as cover crops are suggested. The green stinkbug
 feeds on the black locust, elderberry, honeylocust, black haw
 and wild grape; if these occur near the orchard they should
 be removed.
2143. DEAN, R. W., AND CHAPMAN, P. J. 634.11: 632.75
Biology and control of the apple redbug.
Bull. N. York St. agric. exp. Stat. 716, 1946,
 42 pp., bibl. 20.
 The apple redbug, *Lygidea mendax*, sometimes causes
 extensive damage in New York orchards and is here des-
 cribed. The dark apple redbug, *Heterocordylus malinus*, is
 less important. The bugs cause a reddish stippling of leaves
 and a gnarling and russetting of the fruit. The apple redbug
 can be controlled by (a) a petroleum oil spray applied during
 the dormant or delayed dormant periods, or (b) a contact
 spray or dust applied at the calyx stage or within 5 days of
 the calyx period. The dormant oil spray should contain
 4%, the delayed dormant 3% of a paraffinic base oil.
 Nicotine sulphate (1 pt. to 100 gal.) at the calyx stage is
 the standard recommendation against the nymphal stage.
 Dusts of 2% nicotine or containing 0.15-0.2% pyrethrins
 gave excellent control when applied within 5 days after the
 calyx stage. The redbug is remarkably free from natural
 enemies. An insect, supposedly a hymenopteron, was
 found to attack a small percentage of the eggs.
2144. O'NEAL, E. J., AND FLUKE, C. L. 634.11-2.752
DDT for oyster shell scale control.
Wis. Hort., 1947, 37: 179.
 A serious build-up of oyster shell scale in Wisconsin apple
 orchards is probably due to winter oil spray. The scale was
 controlled at the crawler stage by a single but thorough
 spray of 2 lb. 50% DDT wettable powder in 100 gal. water
 with a mild sulphur fungicide, applied in the middle of June.
 As it is difficult for the grower to determine the hatching
 date, it is recommended that he use DDT in the calyx spray
 (if the plum curculio is not a problem) and in the first two
 cover sprays.
2145. NEPVEU, P. 634.25-2.752
**L'affaiblissement végétatif des pêchers attaqués
 par le pou de San-José: une méthode de mesure.
 (A measure of the loss of vigour of peaches attacked
 by San José scale.)**
C.R. Acad. Agric. Fr., 1943, 29: 461-2 [received
 1946].
 San José scale reduces leaf area by more than 50%, and
 length of summer wood even more. In the author's
 experience when the ratio of total leaf area to the area of
 bark more than two years old drops to one-fifth of normal,
 the tree dies.
2146. BOVEY, P., AND GEIER, P. 632.752
**Le pou de San-José (*Quadraspidiotus perniciosus*
 Comst.) menace nos cultures fruitières. (San
 José scale threatens our orchards.)**
Rev. hort. suisse, 1946, 19: 201-11.
 An account of the life history and control of this pest,
 and of measures to limit its spread in Switzerland.
2147. HADORN, C. 632.752
**Essais pratiques de lutte contre le pou de San
 José dans le Tyrol méridional. (Measures tested
 to control the San José scale in southern Tyrol.)**
Rev. hort. suisse, 1947, 20: 93-9.
 The principal measure at present available is the annual
 winter spray with white oil, preferably with dinitrocresol
 added (yellow oil).

2148. PAILLLOT, A. 634.1/2-2.752/3
Nouvelles formules de traitement d'hiver des arbres fruitiers contre les cochenilles et les oeufs de pucerons. (New formulae for the winter treatment of fruit trees against scale insects and aphid eggs.)
C.R. Acad. Agric. Fr., 1940, 26: 221-4 [received 1947].
- Records favourable results with an oil emulsion containing dinitro-cyclohexylphenol. 5% of the stock emulsion (60% oil) containing dinitro-cyclohexylphenol (1.6%) is the lowest limit for treating trees against scale insects; this corresponds to 3% oil and 0.08% dinitro-cyclohexylphenol. Peach trees treated with 8% emulsion were undamaged.
2149. HAMILTON, D. W. 634.13-2.752
New insecticides for control of pear psylla.
J. econ. Ent., 1947, 40: 234-6, bibl. 1.
- Promising materials include: 8% piperonyl cyclohexenone +0.8% pyrethrins, hexaethyl tetraphosphate, 5% rotenone powder, 50% cubé root paste, benzene hexachloride (which must be applied early to avoid flavouring the fruit), and 14% nicotine dust+hydrated lime. DDT, nicotine bentonite, Ryania, sabadilla, emulsifiable mineral oil, dicyclohexylamine salt of dinitro-*o*-cyclohexylphenol; lauryl isocouplinium bromide, and phenothiazine were less effective or ineffective.—Poughkeepsie, N.Y.
2150. GLENDENNING, R. 632.753
The control of aphids in field and garden in British Columbia.
Processed Publ. Dep. Agric. Canada, Div. Ent. 71, 1947, 4 pp.
- For the control of aphids the following materials may be mixed in bulk by the grower: (1) Nicotine sulphate spray: 40% nicotine sulphate $\frac{1}{2}$ to 1 pint, fish- or whale-oil soap 4 lb., water 100 gal. (2) Derris spray: derris (4% rotenone) 1 lb., spreader 3 lb., water 60 gal. (3) Nicotine dust 1%: 40% nicotine sulphate 16 fluid oz., hydrated lime 50 lb.; mix thoroughly in barrel mixer and keep tightly closed until used. (4) Derris dust 0.5%: derris (4% rotenone) 14 lb., talc 100 lb.
2151. COX, J. A. 634.8-2.754
Control of the grape leafhopper.
J. econ. Ent., 1947, 40: 195-8, bibl. 2, being *J. Pap. Pa. agric. Exp. Stat.* 1346.
- The grape leafhopper was satisfactorily controlled by one early application of DDT, which did not damage foliage or fruit of Concord grapes. Rothane (dichloro diphenyl dichloroethane) also gave good control. Nicotine sulphate and Lethane B-72 (β,β -dithiocarbano diethylether) were effective only temporarily. Hexachlorocyclohexane [666] was not effective.
2152. HARTZELL, F. Z. 634.8: 632.754
Methods of estimating foliage area injured by grape leafhoppers.
Tech. Bul. N. York St. agric. exp. Stat. 277, 1946, 49 pp., bibl. 26.
- A method is described for estimating the area of grape foliage killed by grape leafhoppers, chiefly *Erythroneura comes*. The method involves (a) sampling a definite number of leaves representative of the injury, (b) cutting from each leaf a 35 mm. disc and preserving it dry, (c) estimating the percentage of injured area of each disc, and (d) comparing the various estimates for determining the relative accuracy and speed of each method. Two methods of estimating the damaged leaf area were developed and are described.
2153. DIRECTIE VAN DEN LANDBOUW. 634.11: 632.768
De appelbloesemkever. (The apple blossom weevil.)
Meded. PlZiekt. Dienst. Wageningen 105, 3rd edit., 1947, 22 pp.
- The life history and habits of, and the damage caused by, the apple blossom weevil are described in detail, and an account is given of experiments for its control. Good results were obtained with a 1% Gesarol (a DDT preparation) spray and DDT dust. On most apple varieties the best time to spray is just as the buds are swelling, shortly before the mouse-ear stage. The possibility of combining DDT with an early scab spray of copper oxychloride (not bordeaux mixture as the lime reduces the efficacy of DDT) is discussed. Preliminary trials suggest that heavily spraying the sack bands with a DDT solution will kill any weevils and save labour. The biological control of the weevil is not considered to have any appreciable effect, since the percentage parasitized is very low.
2154. BOUCHET, R. 634.11-2.76
Nouveau procédé de lutte chimique contre l'anthonomie du pommier (*Anthonomus pomorum* L.). (A new chemical control method for the apple blossom weevil.)
C.R. Acad. Agric. Fr., 1944, 30: 349-53 [received 1947].
- The author outlines the life history of the apple blossom weevil and then describes control experiments with a proprietary preparation which has received the name Braconyl. This is a mixture of glycerides of aliphatic acids and sulphides of polychlorocyclohexane, and is found to be not only effective against the adult weevils but also to destroy the eggs. It should be applied at the white bud stage.
2155. BONNEMAISON, L. 634.11-2.76
Essais de traitements chimiques contre l'anthonomie du pommier. (Trials of chemical treatments against apple blossom weevil.)
C.R. Acad. Agric. Fr., 1944, 30: 356-8 [received 1947].
- The results of applications of lime-sulphur and various organic compounds against apple blossom weevil are recorded. The best results were obtained with 1% dinitro-cyclohexylphenol dust.
2156. DOEHLERT, C. A., AND TOMLINSON, W. E., Jr. 634.734-2.768
Blossom weevil on cultivated blueberries.
Circ. N.J. agric. Exp. Stat. 504, 1947, 8 pp.
- The cranberry weevil, *Anthonomus musculus* Say, frequently destroys half to three-quarters of the crop in the infested parts of blueberry fields in New Jersey. The weevil is described and illustrated. The damage it causes is of three types: (1) In the early spring the overwintering weevils feed on the leaf and blossom buds, which fail to open. (2) The weevils lay eggs in the unopened blossoms and the larvae that hatch feed in the flowers and young fruit and cause them to fall. (3) During the summer newly hatched weevils feed on the lower surfaces of the leaves and so form skeletonized areas. Cultivation greatly reduces the number of the overwintering adult weevils, and burning the brush and woodland around the field in early spring will sometimes kill many of them. The most satisfactory spray has been found to be concentrated lime-sulphur 10 gal., arsenate of lead 6 lb., water 90 gal. It may be applied at any time after the weevils appear in numbers on the bushes until early leaf buds have opened; if applied later it may cause serious burning.
2157. DICKER, G. H. L. 634.75-2.76
Control of the strawberry rhynchites (*Rhynchites germanicus* Herbst) with notes on its biology.
J. Pomol., 1947, 23: 63-70, bibl. 8.
- In England the strawberry rhynchites overwinters as an adult in the pupal cocoon in the ground and emerges between mid-March and early May. Eggs are laid on young strawberry leaf stalks, on blossom trusses and near the tips of stolons, from mid-April to late August. The adult then girdles the stalk below the egg cavity, causing

wilting and death of the terminal portion. The larva feeds by hollowing the dead tissue and when fully fed burrows into the soil. Other host plants are wild and cultivated blackberry, raspberry, loganberry, and phenomenal berry. On strawberries a single application of 3% DDT dust, with a gypsum-china clay base, at the rate of 20-25 lb. per acre when the first blossom trusses appear, gave excellent control. Against this pest on cultivated blackberry the dust should be applied as soon as injury to the blossom trusses is noticed, usually early in May.—East Malling Research Station.

2158. DICKER, G. H. L. 634.75-2.76
The strawberry rhynchites and its control.
A.R. East Malling Res. Stat. for 1946, A30, 1947,
pp. 151-3.

A popular account of the life history and the damage caused by the strawberry rhynchites (*R. germanicus*). The differences between it and the strawberry blossom weevil (*Anthonomus rubi*) are described and figured. Control has been obtained on strawberries by applying 3% DDT dust when the first blossom trusses appear. A dust containing 5% benzene hexachloride was much less effective.

2159. DICKER, G. H. L. 634.75-2.76
The strawberry rhynchites and its control.
Grower, 1947, 27: 391-4, 423-5.

Rhynchites germanicus, of blue-green colour and rather square in shape, attacks the stalks of young leaves and flower trusses of the strawberry; it should be distinguished from the strawberry blossom weevil (*Anthonomus rubi*) which is black and rounded and feeds on the blossom buds. *Control*. A study of the life history, followed by field trials in 1945 and 1946, leads to the recommendation of 28 lb. 3% DDT dust per acre, applied into the crowns as soon as the first blossom truss appears.—East Malling.

2160. BRINCOURT, R. 632.77
Contribution à l'étude de la lutte contre la
cératite par le D.D.T. (DDT for the control of
the Mediterranean fruit fly.)
Fruits et Prim., 1947, 17: 103.

DDT, applied as a spray to peaches, may be of value against the Mediterranean fruit fly.—Boucheron.

2161. DEAN, R. W. 634.11-2.77
Apple maggot [*Rhagoletis pomonella*] control
with DDT sprays and dusts.
J. econ. Ent., 1947, 40: 183-9, being *J. Pap.*
N.York St. agric. Exp. Stat. 687.

Apple maggot flies continue to be killed for about 2 weeks after thorough spraying with 1 lb. DDT per 100 U.S. gal. water.—Poughkeepsie, N.Y.

2162. SOENEN, A. 632.78: 634.1/7
Les tordeuses de nos arbres fruitiers. (Fruit
tree tortrix moths.) [Summary in Dutch,
English and German.]
Publ. Centre Recherch. Gorsem 4, 1947 (?),
44 pp., bibl. 25.

Twelve species of fruit tree tortrix moths have been determined, of which 6 are harmful. *Capua reticulana* Hb. is sometimes of economic importance owing to its rapid spread, its many generations and the multiplicity of the damage done on pear and apple trees. Some species may be found during several months, others only for two weeks in the year. Most of the adults fly in early July. The eggs are always found on fruit tree leaves, in groups of 10 to 100. Most species hibernate as caterpillars, concealed in webs; they are greenish and sometimes live on forest trees. Pupation is mostly in the leaves. From the many trials described it is concluded that control is best obtained by (1) Winter spraying with DNC petroleum oils with a high percentage of D.N.O.C. In some cases D.N.O.C. only will give good results. Tar oil is not recommended. (2) Spraying before blossoming using DDT with a wetter, on the young caterpillars, before they are rolled in the leaves.

2163. HELSON, G. A. H. 634.25-2.78
Investigations on the control of oriental peach
moth, *Cydia molesta* Busck., in the Goulburn
Valley, Victoria.
J. Coun. sci. industr. Res. Aust., 1947, 20: 17-24,
bibl. 3.

An account of biological and chemical control experiments, the former unsuccessful. Recent field experiments show that useful control of *C. molesta* can be achieved in the fruit of late canning peaches by two applications of a spray containing 0.1% DDT, the first applied six weeks and the second three weeks before harvest.

2164. YETTER, W. P., Jr. 632.78
New insecticides for the control of oriental fruit
moth.
J. econ. Ent., 1947, 40: 274-5.

A commercial preparation of DDT with hydroxypentamethylflavan, sprayed on peach trees three weeks before harvest, gave some control of the oriental fruit moth without build-up of the mite population.

2165. BOVEY, P., AND MARTIN, H. 634.23-2.78
Essais comparatifs de lutte contre la teigne des
fleurs du cerisier (*Argyresthia pruniella* L.=*A.*
ephippiella Fabr.). (Control trials against the
cherry fruit moth.)
Rev. romane Agric. Vitic., 1945, 1: 1: 6-8, and
1: 2: 6-7 [received 1947].

The life history of the moth is outlined and the damage it causes is described and illustrated. Control trials were carried out with various commercial preparations of normal carbolineums, emulsified carbolineums, dinitrocresols (pastes and powders) and a mixed product, applied in March, and Gésarol early in April. In one experiment carbolineums and dinitrocresols were applied towards the end of January. All the treatments gave satisfactory results, but those with Gésarol were inferior to the rest. The efficacy of the dinitrocresols was at least comparable to that of the carbolineums, in some cases definitely superior.

2166. SMITH, W. W., JENKINS, L., AND HASEMAN, L. 632.782: 634.1/2
A study of codling moth abundance as influenced
by crop failures.
Bull. Mo. agric. Exp. Stat. 472, 1943, pp. 11.

Observations were carried out on codling moth populations in orchards where crop failure was due to (1) late spring frosts, (2) removal of blossoms in a portion of the orchard, (3) alternate bearing combined with spray removal of blossoms. The results from bait trap records and from scraping and banding indicate that there is a marked reduction in codling moth populations in heavily infested orchards in years of light crops and years of complete crop failures. This seems to hold true both where the bloom is sprayed off and where late frost causes crop failure. While alternate bearing or an occasional crop failure greatly reduces worm populations, the data show that the pest is able to rebuild its populations quickly if control measures are neglected.

2167. THERON, P. P. A. 632.782
Experiments on terminating the diapause in
larvae of codling moth.
Reprint from *J. ent. Soc. S. Afr.*, 1943, 6: 114-23
[received 1947].

Prolonged exposure to a temperature of 80° F., to low temperature (14° F.) followed by a temperature of 80° F. had little or no effect in ending the diapause. Exposure to gases of xylol, toluol, carbon tetrachloride, ethylene dichloride, methanol, piperonal, nitrobenzol, pyridine, ethyl iodide, chloroform, and to atmospheres of oxygen and nitrous oxide proved ineffective and so did subjecting hibernating larvae to electrical shocks, to irradiation with gamma rays, and to centrifuging. Artificially enforcing

respinning by removing the larvae from their cocoons and providing fresh cocooning quarters, resulted in a high percentage of pupation (up to 88%) within a relatively short time.—Western Province Fruit Research Institute, Stellenbosch, C.P.

2168. HATTINGH, C. C. 632.782: 634.13
The distribution of codling moth eggs on pear trees.

Reprint from *J. ent. Soc. S. Afr.*, 1943, 6: 124-30 [received 1947].

On the varieties Bon Chretien, Beurre Bosc, and Winter Nelis more eggs were laid on the lower than on the upper leaf-surfaces. On Glout Morceau rather more eggs were laid on the upper than on the lower sides, for the whole season. Up to the beginning of December more eggs were laid on the lower than on the upper leaf surface; from then onwards the position was reversed. These differences in the number of eggs laid on the upper and lower surfaces may be ascribed to the various ways the leaves of the different varieties curl during the dry part of the summer. The attraction of the fruits for oviposition varied with their maturity; it was greatest at pre-picking stage and decreased with maturation. More eggs were laid on twigs and wood at the beginning of the season than later.

2169. JENKINS, L., AND OTHERS. 632.782: 634.11
Codling moth control.
Bull. Mo. agric. Exp. Stat. 459, 1942, pp. 18 [received 1947].

The life history of the codling moth is described and general control measures outlined, including precautions to be taken (1) when planting (the earlier varieties should be planted in blocks well separated from the late varieties), (2) at pruning, (3) in the packing shed (sanitary measures), (4) for orchard sanitation. Spraying, supplementary measures, scraping and banding, the use of moth-proof packing sheds, removal of used containers and poles from orchards, and the elimination of wormy fruits, drops and culls, are discussed. Recommendations for spraying severely infested orchards include the following: (a) Apply the regular pre-bloom lime-sulphur sprays without the addition of lead arsenate, unless there is a leaf roller or cankerworm problem, in which case add 4 lb. of lead arsenate and lime to 100 gal. (b) In calyx spray use 3 lb. lead arsenate to 100 gal. with fungicide and lime. (c) In first cover spray, use same dosage of lead arsenate as in calyx spray with fungicide if scab is still serious, and apply about 10 days after calyx spray, if local moth emergence is normal. (d) In second cover spray use 3 lb. lead arsenate and $\frac{1}{2}$ gal. summer oil emulsion to 100 gal. with "safener" and apply 7 to 10 days after the first cover spray. The third and fourth cover sprays are to be applied at intervals of 10 and 10-14 days respectively. For lightly infested orchards the above may be modified.

2170. HOUGH, W. S. 632.782: 632.951
Influence of some spray ingredients and dosage of lead arsenate on effectiveness of lead arsenate sprays for codling moth control.
Bull. Va agric. Exp. Stat. 388, 1946, 11 pp.

There was no evidence that correctives added to lead arsenate sprays either increased or decreased efficiency of the arsenate except that the use of lime at the rate of 10 lb. per 100 gal. resulted in increased damage by codling moth. Lead arsenate, used at the rates of 2, 3 and 4 lb. per 100 gal. showed marked reduction in stings in going from 3 to 4 lb. Reducing the dosage from 3 to 2 lb. resulted in greater damage from codling moth in years when conditions favoured its activity. In such years a minimum dosage of 4 lb. per 100 gal. was necessary for satisfactory results.

2171. HARMAN, S. W. 632.782
An analysis of the DDT spray program for controlling codling moth.
J. econ. Ent., 1947, 40: 256-8, bibl. 1, being
J. Pap. N. York St. agric. Exp. Stat. 693.

Indications were given by trials in 1946 that the most effective cover sprays against codling were the 3rd and 2nd followed in descending order of importance by the 4th, 5th and 1st sprays. This order would probably vary in a more normal year. The spray used was 1 lb. DDT to 100 gal.

2172. SHAW, H., AND STEER, W. 632.78: 632.951
Laboratory studies on the toxicity of hydrocarbon oils and similar substances to the eggs of some common orchard pests. I. General introduction. II. Experiments on the eggs of the winter moth (*Operophtera brumata* L.).
J. Pomol., 1947, 23: 1-7, 8-22, bibl. 12 and 11.

In part I the materials, methods and test organisms used in a series of investigations on the toxicity of oils to insect eggs are described and the broad chemical classification of these oils is discussed. Part II describes tests against eggs of the winter moth using a selection of tar and petroleum oils covering a very wide range of chemical types. On several physical and chemical characteristics determined for each oil, distillation range, especially the content of oil distilling above 300° C., was most closely related to toxicity. For any one oil, toxicity increased with distillation range up to about 400° C. The petroleum oils were generally more toxic than the tar oils. With some exceptions, the proportion of aliphatic material in the oil appeared to be an important factor in determining toxicity. Paraffinic components were probably more toxic than naphthenic. The phenols and bases isolated from the tar oil contributed but little to the toxicity of the whole oils and were not in sufficient quantity to reduce the toxicity by dilution.—East Malling Research Station.

2173. HAMMER, O. H., AND SHERMAN III, F. 634.23-2.78
Dormant treatments for the control of the cherry casebearer.
Quart. Bull. Mich. agric. Exp. Stat., 1947, 29: 205-7.

The cherry casebearer (*Coleophora pruniella*) is a comparatively new pest of the sour cherry, sometimes causing serious damage to foliage and fruit. Three types of treatment were tested in a Montmorency orchard in 1946: (1) Petroleum oil alone, (2) dinitro materials in or with petroleum oil and (3) dinitro materials in water. Materials of type (3) gave the highest percentage of kill (99.8% for DN Dry Mix No. 2, 2 qt. per 100 gal.) without injuring the buds. Treatment (2) was superior to (1) in respect of control and injury caused.

2174. SUIRE, J. 634.8-2.78
Sur la biologie d'un ampelophage occasionnel, *Epidola stigma* St. Gr. (Lep. Gelechiidae). (The biology of a Tineid moth attacking vines.)
C.R. Acad. Agric. Fr., 1944, 30: 286-7.

Severe defoliation of young vines, in the Hérault département by the Tineid moth *Epidola stigma*, is reported with brief notes on the moth's habits.

2175. PAILLOT, A. 634.8-2.78
L'organisation de la lutte contre la cochyliis et l'eudemis de la vigne. (Control of cochyliis and eudemis on vines.)
C.R. Acad. Agric. Fr., 1940, 26: 189-93 [received 1947].

Good results are recorded against both cochyliis and eudemis with aluminium arsenate and with a synthetic cryolite. Rotenone powder (1% rotenone) gave results inferior to those obtained by arsenate sprays, and barium fluosilicate was inferior to rotenone powder.

2176. PAILLOT, A. 634.8-2.78
L'organisation de la lutte contre la cochyliis et l'eudemis de la vigne (campagne 1940). (The control of cochyliis and eudemis of the vine in 1940.)
C.R. Acad. Agric. Fr., 1940, 26: 867-73 [received 1947].

Two years observations indicate that eudemis is more susceptible to weather than cochylis. As regards control a combined mildew spray is not advised. Among control substances discussed are cryolite sprays and powder and lead- and aluminium-arsenate sprays.

2177. PAILLOT, A. 634.8-2.78
La lutte contre la cochylis et l'eudemis de la vigne. (Campagne 1941.) (The control of cochylis and eudemis of the vine in 1941.)
C.R. Acad. Agric. Fr., 1942, 28: 234-9 [received 1947].

A continuation of trials already mentioned (see No. 2176). Recommendations include lead arsenates, synthetic cryolite 1%, "nascent" aluminium arsenate at a maximum concentration of 0.5%, rotenone dust containing at least 0.65% rotenone, and cryolite dust with 15% of the active ingredient. In a serious attack two applications before flowering are necessary, the first as the flower buds begin to separate, the second 8 to 10 days later.

2178. BOVEY, P., AND MARTIN, H. 634.8-2.78
La lutte contre les vers de la vigne en 1942 et 1943. (Control of the vine moths in 1942 and 1943.)
BOVEY, P.
Résultats des essais effectués en 1945 contre les vers de la vigne. (Experimental control of the vine moths in 1945.)
Pub. Stat. féd. Ess. vitic. arboric. Lausanne, 333, 1944, pp. 15 and 346, 1946, pp. 11 [received 1947].

Various insecticides, including lead arsenate, nicotine, DDT and several other synthetics, were tested against cochylis and eudemis at several stations. DDT gave fair control of the adults; DDT gave good control of larvae if applied just before the eggs hatched.

2179. GALLAY, R., AND BOVEY, P. 634.9: 634.8-2.78
Pour une amélioration de la lutte contre les ennemis des cultures. (To improve control measures against plant pests.)
Rev. romande Agric. Vitic. 1945, 1: 12: 2-5.

An account is given of the measures taken in Switzerland to warn growers when to apply control measures against certain orchard pests, particularly cochylis and eudemis of the vine and codling moth on apple and apricot. The critical times are determined from the periods of flight ascertained from the capture of adult moths in baited cages hung on trees. The warnings are issued by radio or through the press.

2180. MENZEL, R. 634.8-2.78
Bekämpfung tierischer Schädlinge mit DDT-Präparaten. (Pest control with DDT [in vines].)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 70-5.

Cochylis control with DDT has created a red spider problem in vine similar to that experienced in fruit trees. Restriction of the number of applications is therefore recommended. In spraying against the first generation only the young inflorescences and against the second generation only the grapes should be treated.—Wädenswil Research Station.

2181. BOVEY, P., AND MARTINOLI, L. 634.22-2.793
Les hoplocampes des prunes, *Hoplocampa minuta* Christ et *Hoplocampa flava* L. (Plum sawflies.)
Rev. romande Agric. Vitic. 1945, 1: 4: 5-8 [received 1947].

Two species of sawfly attacking plums and the damage they cause are described and illustrated. In trials carried out in Switzerland good results were obtained with Gesarol, but it must be applied just as the last petals fall, and the trees must be thoroughly covered.

2182. GÜNTART, E., AND HOLENSTEIN, R. 634.22-2.793

Les possibilités de lutte contre l'hoplocampe ou mouche à scie du prunier—biologie de l'insecte. (Life cycle and control of the plum sawfly.)
Rev. hort. suisse, 1947, 20: 2-5.

The life cycles of *Hoplocampa minuta* and *H. flava* (the black and the yellow plum sawflies) are similar in Switzerland. Benzene hexachloride (1%) applied immediately after flowering gave better control than the DDT products tested.

2183. OTAMENDI, J. C. 632.796: 632.951
Procedimiento de combate contra las hormigas podadoras, mediante el empleo del sulfuro del carbono gasificado en frío. (The destruction of ants by fumigating with carbon disulphide.)
Publ. Inst. San. Veg. B. Aires, 1947, Año 3, Ser. B, No. 9, 7 pp.

Describes with diagram an apparatus for forcing gaseous carbon disulphide into ants' nests.

2184. GLENNENNING, R. 632.64
Slug control in British Columbia.
Processed Publ. Dep. Agric. Canada, Div. Ent. 70, 1947, 4 pp.

Methods of controlling slugs are discussed under (1) Soil treatment (cultivation to obtain a fine tilth with a well compacted sub-surface), (2) Traps and barriers; the best trap is a piece of bark, not less than 6 inches square; the best material for a barrier is a collar of fly screen about 2 inches wide which may be sunk in the ground for half its width around the plant, or tacked to the edge of a flat or cold frame. (3) Metaldehyde bait; this can be made at home by mixing 1 oz. of powdered metaldehyde with 4 quarts of bran, applied moistened or dry, and either broadcast or placed in small piles near the plant attacked. (4) Contact dusts: a dust composed of dehydrated copper sulphate and lime (1: 10) gives excellent control and is non-injurious to plants; this method is much cheaper than metaldehyde baits but the work must be done at night when most of the slugs are out feeding. (5) Natural enemies, e.g. snakes, toads, shrews, and, where they can be allowed to run without harm to crops, duck and geese.

2185. STRINGER, A. 632.64
A note on the action of metaldehyde on slugs.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 87-8.

Metaldehyde is toxic to slugs but recovery from a low dosage may occur at a relative humidity of 95-100.

2186. REED, L. R. 632.5 + 632.954
Weeds and weeding.
North. Gdnr., 1947, 1: 144-7, 172-4.

Non-selective weed killers, sodium chlorate, arsenicals, tar acids and phenols, are useful for paths but useless in crops. Selective weed killers destroy certain weeds without damage to certain crops. Early chemicals in this group depend for their action on morphological differences between the cereals or grasses they leave unharmed and the broad-leaved weeds they destroy; they include copper sulphate and chloride, iron sulphate, sulphate of ammonia, sulphuric acid and dinitro-orthochresol as sprays, and kainit and calcium cyanamide. New selective weed killers are plant growth substances, notably 4-chloro 2-methyl phenoxy acetic acid (Methoxone) and 2,4-dichlorophenoxyacetic acid (2,4 D), that distort and kill broad-leaved plants without damaging cereals, and certain oils that are toxic to many weeds but fail to harm young carrots and parsnips.

2187. SMITH, F. G., HAMNER, C. L., AND CARLSON, R. F. 632.954
Changes in food reserves and respiratory capacity of bindweed tissues accompanying herbicidal action of 2,4-dichlorophenoxyacetic acid.
Plant Physiol., 1947, 22: 58-65, bibl. 19.

Treatment caused rapid increases in total sugars and decreases in starch-dextrins in all parts of the plant; N decreased in the leaves but increased in stems and rhizomes. Respiration increased in the rhizomes. It is suggested that the herbicidal action is due to disturbance of the phloem function rather than to depletion of reserves.—Geneva, N.Y.

2188. SUNDELIN, G., GUSTAFSSON, H., AND JACOBSON, G. 632.954
Preliminära resultat av ett års försöksmässig
prövning av det engelska ogräsbekämpningsmed-
let agroxon. (Preliminary field trials with the
English weed killer Agrozone.) [English sum-
mary $\frac{1}{2}$ p.]
J. roy. Swedish Acad. Agric., 1947, 86: 141-54,
bibl. 5.

The English herbicide Agrozone was tested in Sweden, where applications of 20 kg. per hectare gave good results against such troublesome weeds as *Galeopsis*, *Chenopodium album*, *Thlaspi arvense*, *Spergola arvensis*, *Sinapis*, etc., whereas *Stellaria media* and *Polygonum* were not sufficiently damaged. The development of peas was adversely affected by applications of 20 kg. per hectare.

2189. CRAFTS, A. S. 632.954
General-contact weed killers.
Circ. Calif. agric. Ext. Serv. 137, 1947, pp. 16.

An account of the advantages and disadvantages of the various non-selective herbicides—water-soluble salts and acids, emulsions, and oils. Oils are of value for controlling weeds in uncultivated orchards; they are easy and safe to handle and may be fortified by the aromatic by-products of petrol refineries. The physical properties used to specify oils, viz. boiling point, gravity, flash point and viscosity, are explained simply.

2190. JOHNSON, E. M. 632.954
Injury to plants by minute amounts of 2,4-dichloro-
phenoxyacetic acid.
Phytopathology, 1947, 37: 367-71.

Laboratory tests with the ethyl and butyl esters of 2,4-D indicate that toxic residues of both esters may remain in metal spray equipment after successive washings in hot water and soap and strong alkali. Two washings of metal sprayers with acetone apparently removed most of both esters, but some injury still occurred to zinnia, petunia and *Nicotiana rustica* when these plants were placed under a bell jar with one of the sprayers, and to tomato plants sprayed with water from the sprayers. The results indicate the difficulty of removing toxic residues of the esters of 2,4-D from spray equipment and that volatile products from equipment and containers may injure sensitive plants in closed rooms or greenhouses. Three washings with tap water appeared sufficient to remove toxic residues of both the ammonium and sodium salts of 2,4-D from metal sprayers.

2191. HARVEY, W. A. 634.3-2.954
Chemical weed killers.
Calif. Citogr., 1947, 32: 139, 172-4.

A short, popular article dealing mainly with 2,4-D, its chemical nature and mode of action. Useful information is given on cost of treatment, the response of different weeds, the effect on the soil, the time to spray and precautions to be taken. It is stated that there are over 60 commercial products containing 2,4-D registered in California.

2192. MOORE, R. M. 577.17: 632.954
The possibilities of the plant growth-regulating
substances as herbicides in Australia.
J. Aust. Inst. agric. Sci., 1947, 13: 54-8, bibl. 7.

The results of small-scale tests with phenoxyacetic acid derivatives and two urethane compounds are briefly reported.

2193. LUCAS, E. H., AND HAMNER, C. L. 632.954
Modification of the physiological action of the
sodium salt of 2,4-dichlorophenoxyacetic acid by
simultaneous application of plant extracts and by
pH changes.
Quart. Bull. Mich. agric. Res. Stat., 1947, 29:
256-62, bibl. 2.

The authors found that the addition of an aqueous onion extract to 2,4-D increases the herbicidal action significantly. The effect of the onion extract was further increased by treatment with adsorptive substances, e.g. Celite No. 501. When the average weight of bean shoots treated with one drop of 2,4-D at 1,000 p.p.m. is described as 100, that of shoots treated with 2,4-D in concentrated onion extract (Celite-treated) was 13, that of untreated controls being 180. 2,4-D salt in tomato extract was 7% more effective than 2,4-D salt in water. The addition of citric and l-malic acid to a solution of 2,4-D salt increased the herbicidal action to such an extent that it was equivalent to that of the ester. A photograph shows the great difference in bean plants treated with 2,4-D salt solution buffered at pH 3 and pH 6.

2194. ANON. 632.954
Clean sprayers thoroughly when using new
materials.
Wis. Hort., 1947, 37: 179.

Warning: it is almost impossible to remove 2,4-D from wooden tanks. It may be removed from metal tanks by an alkaline wash, followed by plenty of water.

2195. ANDERSON, H. W. 632.3: 632.96
The relation of antibiotics research to horticulture.
Trans. Ill. St. hort. Soc. for 1945, 1946, 79:
264-70 [received 1947].

Amongst other possibilities, the author suggests that antibiotics may be of use in the control of bacterial diseases of plants and, further, that it might be possible to produce these antibiotics in nutrient solutions applied to the surface of living plants.

2196. ANON. 632.96
Antibiotics.
57th A.R. Agric. Exp. Stat. 1946, p. 59.

"Stem galls on bryophyllum and other plants were cured with applications of penicillin and streptomycin. On galls of bryophyllum streptomycin worked even faster than penicillin. This appears to be the first announcement of cure of crown gall [*Bacterium tumefaciens*] by applications of the former antibiotic."

2197. MÉTALNIKOFF, S. 632.96
Utilisation des méthodes bactériologiques dans
la lutte contre les insectes nuisibles. (A bacterio-
logical method of controlling insect pests.)
C.R. Acad. Agric. Fr., 1940, 26: 77-83 [received
1947].

A method is described for controlling insect pests by spraying the host plant with a suspension of dried sporiferous bacteria toxic to insects. An experiment is described in which its efficacy was shown when sprayed on vines infested with the caterpillars of the pyralid moth. One great advantage over such insecticides as arsenates and nicotine is that it is not toxic to man.

2198. THERON, P. P. A. 632.78: 632.96
The artificial conditioning of lepidopterous larvae
for attack by ectoparasitic ichneumonid larvae.
Reprint from *J. ent. Soc. S. Africa*, 1945, 8: 111-6
[received 1947].

Prior to oviposition, the introduced parasites attacking the codling moth larvae, viz. *Cryptus sexannulatus* Grav. and *Ephialtes caudata* Rat. sting and immobilize their host which must remain in a fit state of preservation long enough for the parasite larva to complete its development. Under

- laboratory conditions pronounced superparasitism has been encountered amongst *Cryptus* and *Ephialtes*, with wastage of valuable parasite eggs and host material. The false codling moth, *Argyroplote leucotreta* Meyr., has proved a satisfactory host for these parasites, and artificially reared larvae of this moth were used throughout the experiments described. The best treatment for keeping quality was found to be immersion in water at 75° C. for one minute with the addition of paraffin wax (M.P. 40° C.) which lengthened the keeping period of host larvae to 4 days.—Western Province Fruit Research Station, Stellenbosch, C.P.
2199. STANILAND, L. N. 632.95
Hot-water treatment of plants.
Agriculture, 1947, 54: 278-82, bibl. 6.
Practical directions with helpful illustration for hot water treatment in the following cases: bulb eelworm and other bulb pests, chrysanthemum eelworm, strawberry runners, rust on mint runners.
2200. KING, K. M., AND ANDISON, H. 632.944
A simple plough-equipment for applying liquid fumigants to the soil.
Processed Publ. Dep. Agric. Canada, Div. Ent. 68, 1947, 6 pp.
The soil fumigator is easy to construct on the farm or in a garage, at a cost of 10 to 15 dollars for its component parts. The apparatus described and illustrated is for a two-gang plough but can be adapted easily for either single or two-way ploughs.
2201. DIRECTIE VAN DEN LANDBOUW. 632.9: 634.1/7
Bestrijdingsschema voor fruitgewassen. (Pest and disease control for fruit trees.)
Meded. PI Ziekt. Dienst Wageningen 73 (13th edit.), 1947, 12 pp.
This bulletin consists of two spray programmes with instructions for using them. Scheme A is a general programme to show the applications that should be made in winter, spring and summer, the crops to be sprayed, and the parasites for which they are intended. Scheme B, as a supplement folder, takes the parasites and pests one by one and shows the measures to be taken (sprays and their concentrations) and the times of application.
2202. DIRECTIE VAN DEN LANDBOUW. 632.95: 634.1/7
Handleiding bij de besputting van fruitgewassen. (Handbook for the spraying of fruit trees.)
Meded. PI Ziekt. Dienst, Wageningen 86, 4th edit., 1947, 31 pp.
This bulletin describes the preparation and application of fruit tree carbolineum, emulsified carbolineums, DNC preparations, mineral oil preparations, combined mineral oil and DNC preparations, bordeaux mixture, copper oxychloride, lime-sulphur, barium polysulphide, colloidal sulphur preparations, lead arsenate, nicotine, derris, Ionchocarpus and pyrethrum, DDT preparations, combination sprays and spreaders. It ends with an account of spraying machines and general hints on spraying.
2203. ANON. 632.95
Lijst van bestrijdingsmiddelen tegen plantenziekten en schadelijke dieren. (A list of fungicides and insecticides.)
Meded. PI Ziekt. Dienst, Wageningen 108, 1947, 16 pp.
A list of the names or brands of proprietary insecticides or fungicides with the names and addresses of firms in Holland that supply them.
2204. ANON. 632.95
Standardized spray nomenclature.
Phytopathology, 1947, 37: 357-8.
A standardized spray nomenclature for deciduous fruit trees compiled by the American Phytopathological Society Committee on Standardization of Fungicidal Tests, with the co-operation of plant pathologists, entomologists, and horticulturists of various regions of the United States. The terms employed are believed to express the best general and current usage. Reprints may be obtained at 10 cents each from the Committee Chairman, Boyce Thompson Institute, Yonkers 3, New York.
2205. LACOMBE, R. 632.95
Nouveaux procédés de pulvérisation. (New methods of spraying.)
Prog. agric. vitic., 1947, 127: 455-61.
Methods of applying fungicides and insecticides are described under: A. Mechanical spraying—the mechanism of nozzles is described and illustrated. B. Pneumatic spraying. C. Spraying with wetters. D. Electric dusting.
2206. YADOFF, O. 632.951: 631.588.1
Un nouveau procédé de poudrage électrique des végétaux. (A new way of dusting plants electrostatically.)
C.R. Acad. Sci. Paris, 1946, 222: 544-6, noted in *Rev. Vitic.*, 1947, 93: 277.
HAMPE, P.
Les poudreuses électriques à champ ionisé. (Electrostatic dusting machines.)
Rev. Vitic., 1947, 93: 259-61.
A negative electric charge causes dust particles to be distributed more uniformly, on account of their mutual repulsion, and to adhere more firmly to the leaves, whose charge is opposite.
The second author describes briefly two machines employing recently developed electrostatic generators. The knapsack duster includes a generator producing 4 watts at 35 kv. and weighing only 2 kg. On the insulated fishtail outlet of the duster are mounted two live points which should be kept within 30 cm. of the plants. Standard power dusters are electrified indirectly: behind the nozzles and across their full width, three well insulated horizontal wires connected to a 200 watt, 100 kv. machine are arranged about 50 cm. above the plants. This machine does not leave a cloud of dust, thereby saving material.
2207. KELLER, K. L. 632.95
New type wind-tunnel spray-boom for dust or wet spray or combination of both.
Trans. Ill. St. hort. Soc. for 1945, 1946, 79: 70-5.
Amongst the advantages claimed for this boom are: that one operator can replace a crew of 3; its greater accuracy of cover and speed in spraying, and greater ease in operation; its reasonable cost; that it works equally well on peaches, cherries or apples; and it can be attached to any horse- or tractor-sprayer of 12 gal. per minute capacity, or over.
2208. GINDLHUBER, W. 632.95
Doppelzerstäuber bei der Winterspritzung in Baumschulen. (A two-nozzled spray gun for winter spraying in nurseries.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 108-9.
An Austrian nurseryman describes a spray gun with two nozzles facing each other, so that the nursery tree is treated from opposite sides simultaneously. It was found that this tool allows 70% more trees to be sprayed thoroughly in the same time and with the same amount of liquid, than the ordinary single-nozzle spray gun.
2209. RASMUSSEN, E. J. 632.95: 656.7
The airplane for crop protection.
Trans. Ill. St. hort. Soc. for 1945, 1946, 79: 134-46.
The efficacy and cost of dusting and spraying crops from the air are discussed. The advantages and requirements of this method are considered.
2210. BUSH, R. 632.95
And now the Autoblast.
Grower, 1947, 27: 648-52.
An illustrated account of trials of a British prototype of an automatic air-blast spraying machine. Wash from a

500-gal. tank is delivered at 100 lb./sq. in. to adjustable nozzles at the rear, and the spray is carried out by a suitably deflected air blast, provided by a 60-in. fan driven at 2,000 r.p.m. by an engine of 130 h.p. Including stops for refilling, etc., an hour sufficed to cover 4 to 5 acres very thoroughly with about 400 gal./acre.

2211. MOORE, M. H. 632.951: 634.11-1.541.11
Apple rootstocks as an outdoor host for mass infection and fungicide testing.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 118-9.

Unworked apple rootstocks, manipulated so that they produce a succession of annual shoots which are ideal for detailed observations, have been used for outdoor mass infection experiments with certain parasitic fungi, particularly *Venturia inaequalis*, the cause of apple scab. The method is suggested as applicable to the testing of fungicides.

2212. DAVIES, W. H., AND SEXTON, W. A. 632.952.1
Chemical constitution and fungistatic action of organic sulphur compounds.
Biochem. J., 1946, 40: 331-4, bibl. 12.

The relative fungistatic activities of a series of organic sulphur compounds against *Botrytis cinerea*, *Fusarium* spp., etc., are recorded. In many cases the sulphur compound *per se* did not make any contribution to the fungistatic action.—I.C.I. Research Laboratories, Blackley, Manchester.

2213. BRUNO, A. 632.951
Sur une nouvelle formule de bouillie cuprique. (A new copper spray formula.)
C.R. Acad. Agric. Fr., 1940, 26: 454-7 [received 1947].

The spray fluid described is prepared as follows: Dissolve 1 kg. copper sulphate in about 50 litres of water. Dissolve 1,250 to 1,300 g. trisodium phosphate ($\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$) in 20 to 30 litres of water. Pour the latter into the former and add water to make up to 100 litres, stirring with a stick or piece of wood. This is referred to as 1% phospho-cupric spray. At this strength there is little to fear from scorch, and no damage has been observed after applying it to vine, apple, pear, peach and even cherry in flower, potato and tomato. There is no coarse sediment and therefore no obstruction of nozzles. It stays well in suspensions, and adherence is very satisfactory.

2214. FRON, —, AND WILLAUME, —. 632.952
Emploi pratique des bouillies cupriques dans les circonstances actuelles. (The use of copper spray under present conditions.)
C.R. Acad. Agric. Fr., 1942, 28: 420-3 [received 1947].

To overcome the difficulties due to the scarcity of copper compounds (with particular reference to wartime conditions) for spraying vines the author recommends the addition of nascent aluminium gel to copper-containing spray fluids to enhance their efficacy. This allows the employment of the copper compounds at lower concentrations and it is claimed that it effects an economy of 70 to 80% copper. The preparation of the spray fluid is described.

2215. ZÄCH, C. 634.8-2.952
Über die Regenbeständigkeit von Kupferspritzmitteln. Laboratoriumsversuche an Spritzmitteln für den Weinbau. (The resistance of copper sprays to rain. Laboratory tests of sprays applied in viticulture.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 67-70.

The rain resistance in descending order of the more common copper fungicides was as follows: bordeaux mixture, copper oxychloride paste, cuprous oxide, copper oxychloride dust.—Wädenswil Research Station.

2216. NEPVEU, P. 634.25-2.952+2.944
Sur la possibilité de faire, sur pêcher, une fumigation cyanhydrique après application de bouillie bordelaise. (The possibility of fumigating peaches with hydrocyanic acid after applications of bordeaux mixture.)
C.R. Acad. Agric. Fr., 1944, 30: 289-90 [received 1947].

Under the conditions of the Côte d'Azur at least, vines can without injury be fumigated with hydrocyanic acid in frames after applications of bordeaux mixture, provided that an interval of a fortnight is allowed between the two treatments.

2217. HELSON, G. A. H. 632.951
The use of insecticidal aerosols on agricultural crops.
J. Aust. Inst. agric. Sci., 1947, 13: 38-40, bibl. 5.

A review which deals with low-boiling solvents for dispersing insecticides and the equipment required for the preparation of insecticidal aerosols. It is claimed that aerosols are a most effective means of distributing DDT. The formula of a DDT aerosol for use against insect pests on peas, beans, potatoes and onions is given.

2218. BENNETT, S. H., KEARNS, H. G. H., AND MARTIN, H. 632.6/7: 632.951
Investigations on egg-killing washes. III. The ovicidal properties of certain organic thiocyanates.*
J. Pomol., 1947, 23: 38-49.

The ovicidal action of certain organic thiocyanates was tested on eggs of the green apple aphid (*Aphis pomi*), the apple sucker (*Psylla mali*), the winter moth (*Operopthera brumata*), and the fruit tree red spider mite (*Oligonychus ulmi*). Dodecyl thiocyanate, butyl carbitol thiocyanate and $\beta\beta'$ -dithiocyanodiethyl ether in soap or sulphite lye emulsions containing 0.4% thiocyanate with or without 5% petroleum oil of winter wash grade, are effective against *A. pomi*. Dodecyl thiocyanate at 0.4% with or without 5.0% petroleum oil was effective against eggs of *P. mali* when applied in sulphite lye emulsions. Dodecyl thiocyanate (0.4%), butyl carbitol thiocyanate (0.4%), β -thiocyanoethyl laurate (0.225%) and $\beta\beta'$ -dithiocyanodiethyl ether (0.225%) are ineffective against eggs of *O. brumata*, but do not reduce the ovicidal action of 5% petroleum oil emulsified with sulphite lye. Dodecyl thiocyanate at 0.4% was effective against eggs of *O. ulmi* and augmented the potency of 5% petroleum oil emulsions.—Long Ashton Research Station, Bristol.

2219. BENNETT, S. H., KEARNS, H. G. H., AND MARTIN, H. 632.951
Rain resistance of winter washes.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 85-7, bibl. 2.

In laboratory trials dimitto-*o*-cresol was more resistant than tar oil to leaching, and gum-casein emulsions no more resistant than sulphite lye emulsions.

2220. NEAL, A. L., AND OTHERS. 634.23-2.951
Economic value of oil-wax emulsion sprays in cherry orchard practices.
Quart. Bull. Mich. agric. Exp. Stat., 1947, 29: 220-5, bibl. 3.

The preliminary experiments reported upon *ibid.*, 1945, 27: 338-51; *H.A.*, 15: 1466, were followed up by field trials. These were carried out in 3 different Montmorency cherry orchards and confirmed the earlier observations that the application of oil-wax emulsions increases the size of fruits. On the average, an increase of about 10% was obtained as a result of 2 applications incorporated in the second and third fungicidal cover sprays. Some of the emulsions tested were manufactured on a commercial scale; Dowax 222 appears to be most convenient from the grower's point of view. The emulsion should be used at a dilution of

* For earlier papers see *H.A.*, 16: 502 and 17: 353.

1 : 100 and the trees given a thorough coverage. Directions are given for preparing the dilute emulsion. Applications of wax-oil emulsions, especially in combination with routine spraying, are considered very profitable.

2221. FEYTAUD, J., AND DE LAPPARENT, P. 632.951
Influence de la température sur le pouvoir insecticide des poudres rotenonnées. (The influence of temperature on the insecticidal action of rotenone powders.)

C.R. Acad. Agric. Fr., 1940, 26: 408-12.

Under laboratory conditions it was found that, with temperatures from 10° C. to 28° C., reducing the temperature reduces the rapidity of action of rotenone. A temperature of 28° C. favours rotenone action and appreciably reduces the time necessary for total paralysis and death of insects coming in contact with the preparation. Darkness does not affect the result, so that at the same temperature the action is as rapid by night as by day.

2222. FEYTAUD, J., AND DE LAPPARENT, P. 632.951
Recherches sur les poudres rotenonnées. III. Le dosage rationnel. (Rotenone powders. III. Practicable mixtures.)
C.R. Acad. Agric. Fr., 1940, 26: 923-8 [received 1947].

The action of various proportions of rotenone powder and talc was recorded, with larvae of the Colorado beetle as test objects. It was found that 30% rotenone powder produced an effect identical with, and 25% almost the equivalent of, that of the pure powder. 15% was so good that, for economy, it is recommended as a maximum. The strict minimum is 3% but the author advises against reducing the proportion below 5%.

2223. FEYTAUD, J., AND DE LAPPARENT, P. 632.951
Recherches sur les poudres rotenonnées. IV. Lumière soleil. (Rotenone powders. IV. Light and sun.)
C.R. Acad. Agric. Fr., 1941, 27: 663-8 [received 1947].

It was found that neither artificial light nor sunlight has any effect on the action of rotenone when using Colorado beetle larvae as test insects.

2224. WOODRUFF, N., AND TURNER, N. 632.951
The effect of particle size on the toxicity of DDT diluents in water suspension.
J. econ. Ent., 1947, 40: 206-11, bibl. 8.

The toxicity of DDT to houseflies in the laboratory and to potato insects in the field was increased by a reduction in the particle size.

2225. DELHAYE, R. 634.8-2.951
Note sur les possibilités d'utilisation du DDT dans la culture de la vigne sous verre. (The use of DDT on vines in greenhouses.)
Parasitica, 1946, 2: 68-9.

Greenhouse trials showed that 10% DDT dust was very effective against thrips (*Heliothrips haemorrhoidalis*) but had no appreciable effect on red spider (*Tetranychus urticae*). The treatment caused no damage to the vines.

2226. EATON, J. K. 632.951
The formation of phosgene from DDT and related compounds.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 129-30, bibl. 5.

A reported evolution of phosgene on mixing DDT and copper oxychloride (*The Times*, 10 December, 1945) has not been confirmed by the tests here described. Only under conditions of vigorous oxidation, not likely to be encountered in agricultural practice, has phosgene been produced from DDT and certain related compounds.

2227. ANON. 638.158: 632.951

DDT and bees.

DDT News,* No. 1, 1946, 7 pp.

A brief review of information on the effect of DDT on bees. It is concluded that bees are less susceptible to DDT than was at first feared. Bees on the wing can, no doubt, be killed by thorough drenching with a DDT spray but they rarely stay to receive a wetting. A deposit of DDT appears not to offer a very serious threat either to adult bees or to the brood they may feed with pollen collected from sprayed trees. Certain precautions, however, should be taken. Hives should be protected from direct drift when spraying and dusting, and an abundant and convenient supply of clean water should be available for the bees. The spraying of open flowers should be avoided.

2228. ROSELLA, E. 632.95: 638.12

Un nouvel arrêté défend les abeilles. (A new order protects bees.)

Prog. agric. vitic., 1947, 127: 393-4.

An Order of 25 February, 1947, forbids in France the application of certain organic insecticides (including DDT, 666, and their derivatives) (1) On fruit trees (a) during full flower, (b) (for DDT only) during the fortnight preceding fruit picking. (2) On forest and avenue trees. (3) On plants visited by bees—during the period of full bloom. (4) (for DDT) On harvested crops, e.g. cereal and leguminous plants used for food or fodder. The implications of the Order are discussed.

- 2229.

a THE AMERICAN PHYTOPATHOLOGICAL SOCIETY. COMMITTEE ON STANDARDIZATION OF FUNGICIDAL TESTS. 632.951

Test tube dilution technique for use with the slide germination method of evaluating protectant fungicides. Standardized spray nomenclature. *Phytopathology*, 1947, 37: 354-6, 357-8.

b ANSARI, A. R. 634.1/7-2.752
Bourbon scale [*Aspidiotus destructor*]—a warning to fruit growers.
Punjab Fruit J., 1947, 11: 175-7, bibl. 2.

c BOSELLI, F. B. 632.728
Osservazioni biologiche sul *Dociostaurus maroccanus* Thnb. in Sardegna. I. Correlazione fra periodicità delle infestazioni di *Dociostaurus maroccanus* Thnb. e precipitazioni atmosferiche. (Biological observations on the Moroccan locust in Sardinia. I. Correlation of periodicity of infestations with rainfall.) (Publ.) *Minist. Agric. For. Osserv. Fitopat. Sardegna*, Cagliari, 1946, 32 pp., bibl. 10.

d CAGLE, L. R. 632.654.2
Life history of the European red mite [*Paratetranychus pilosus*].
Tech. Bull. Va agric. Exp. Stat. 98, 1946, 19 pp.

e CRAFTS, A. S. 632.944: 632.954
Toxicity of certain herbicides in soils.
Hilgardia, 1945, 16: 459-83, bibl. 12.

f CRAFTS, A. S., AND REIBER, H. G. 632.944: 632.954
Studies on the activation of herbicides.
Hilgardia, 1945, 16: 485-500, bibl. 5.

g DUBBRISAY, —. 632.95
Propriétés et étude des produits mouillants. Théorie élémentaire du mouillage. (Wetting products and the theory of wetting.)
C.R. Acad. Agric. Fr., 1941, 27: 746-52, bibl. 7 [received 1947].

* Issued by the Geigy Co.

- h EVERS, N., AND CAMPBELL, N. R. 633.88 + 632.96
Fine chemicals and medicinal substances.
Appl. Chem. Repts., 1945, 30: 502-20, bibl. 128.
Includes antibiotics and alkaloids.
- i GERBALDI, C. 632.952
Ricerche sul modo migliore di preparazione della poltiglia bordellese all'uno per cento di solfato di rame e calce idrata in polvere. (Trials of the best method of preparing bordeaux mixture 1 kg. sulphate of copper: 1 kg. hydrated lime: 100 l. water.)
Riv. Frutticoltura, 1942, 6: 10-17 [received 1947].
- j HAFIZ, A. 634.25-2.4
Peach leaf curl.
Punjab Fruit J., 1947, 11: 178-9.
- k HANNESSON, H. A. 632.944: 632.954
Movement of carbon disulfide vapor in soils as affected by soil type, moisture content, and compaction.
Hilgardia, 1945, 16: 501-10, bibl. 5.
- l MCCLELLAN, W. D., CHRISTIE, J. R., AND HORN, N. L. 632.944
Effect of temperature and moisture on the efficacy of soil fumigants.
Abstr. in *Phytopathology*, 1947, 37: 440.
- m MCKINNEY, H. H. 632.8
Survival of labile viruses in desiccated leaf tissue.
Abstr. in *Phytopathology*, 1947, 37: 441-2.
- n MARSAIS, P. 632.952
Toxicité du cuivre et mode d'action sur les parasites végétaux. (The toxicity and fungicidal action of copper.)
C.R. Acad. Agric. Fr., 1942, 28: 162-9 [received 1947].
- o ROGERSON, J. P. 634.23-2.753
The oat bird-cherry aphid, *Rhopalosiphum padi* L. and comparison with *R. crataegillum* Theo. (Hemiptera, Aphididae).
Bull. ent. Res., 1947, 38: 157-76, bibl. 16.
- p SMITH, C. O. 632.4: 634.22
A study of *Tranzschelia pruni-spinosae* on *Prunus* species in California.
Hilgardia, 1947, 17: 251-66, bibl. 11.
- q STAMMERS, F. M. G., AND WHITFIELD, G. S. 632.951
The toxicity of DDT to man and animals.
Bull. ent. Res., 1947, 38: 1-73, bibl. 113.
Properly managed—harmless.
- r WOODSIDE, A. M. 634.25-2.754
Weed hosts of bugs which cause cat-facing of peaches in Virginia.
J. econ. Ent., 1947, 40: 231-3, bibl. 4.

VEGETABLES, TOBACCO AND OTHER CROPS.*

2230. BOSWELL, V. R. 635.1/7: 631.521.6
Disease-resistant and hardy varieties of vegetables.
Nat. hort. Mag., 1944, 23: 59-63, 138-43, 203-8; 1945, 24: 268-73; 1946, 25: 158-64.

After noting a number of instances of successful early work the writer considers outstanding accomplishments of the breeder and selector in the United States in meeting the demands for particular vegetables which will stand up to heat, cold, specific diseases and sometimes insects. Advances in this respect are considered with regard to the following vegetables: beans, cabbage, celery, sweet corn, cucumber, melons, squashes and pumpkins, tomatoes, peppers, eggplant, lettuce, peas, rootcrops and spinach. He regrets the time lag between discovery and availability to the general public of the new varieties, but thinks this could be considerably lessened if growers and gardeners were better informed of their availability and demanded them.

2231. SNYDER, L. C. 635.1/7
Vegetable varieties tested, 1946.
Minn. Hort., 1947, 75: 55, 58.

A discussion of some new varieties of pea, lettuce, cucumber, muskmelon, pumpkin, tomato, bean and sweet corn produced elsewhere but tested in Minnesota.

2232. MINISTRY OF AGRICULTURE, LONDON. 635.1/8: 631.544
Crop production in frames and cloches.
Bull. Minist. Agric. Lond. 65, 1947, pp. 48, 18 plates, 2s. 6d.

The first edition of this bulletin was issued in 1933, under the title, *The cultivation of vegetables in frames*, and has gone through several editions since then (*H.A.*, 4: 234; 7: 789; 12: 900 and 14: 183). The present edition, which has been rewritten completely and brought up to date, contains much additional information. It is admirably illustrated. A short introduction dealing with size of production unit, choice of site, soils, climate, and shelter

belts is followed by illustrated descriptions of different types of frames and the various methods of heating them, including electric devices. The second part of the bulletin is devoted to systems of crop production in heated and cold frames and to the treatment of market-garden crops grown under the four distinct systems described. The subject of cloche cultivation is given a section to itself, most of which is devoted to continuous cloches. There is a very brief final section on pests and diseases.

2233. IPATJEV, A. N., KOČKINA, V. A., AND PILIPENKO, A. G. 635.1/7: 631.531
Results of experiments to regulate the yield of seeds of vegetables. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947, No. 2, pp. 22-4.

In Siberia seeds of onions, carrots and beet often fail to ripen. It was hitherto considered necessary to regulate the number of seed heads on each plant so as to ensure a satisfactory crop of seeds prior to the onset of frosts. This was done 2 weeks before the occurrence of the first frost in autumn by removing all flowers or inflorescences and leaving only well-set flowers. Further experiments, recorded in this paper, of the removal of shoots or inflorescences during the vegetative period gave negative results; the yield of onion and carrot seeds was greater in normal controls than in those plants in which the number of shoots and flowers was reduced.—Siberian Research Institute of Cereal Crops.

2234. FOSTER, A. A. 635.1/7: 631.531.17
Acceleration and retardation of germination of some vegetable seeds resulting from treatment with copper fungicides.
Phytopathology, 1947, 37: 390-8, bibl. 42.

After treatment with copper sulphate and cuprous oxide, seeds of beet, cabbage, cucumber, eggplant, pea, pepper, and spinach were germinated on moist filter paper in Petri dishes, on steamed soil and on infested soil. The fungicides reduced or retarded germination of cabbage, cucumber, and pea, but increased or accelerated germination of beet, eggplant, pepper, and spinach. The three kinds susceptible to copper injury contain sulphhydryl groups, and those of the four kinds which are tolerant to copper do not.—Central Florida Experiment Station, Sanford, Florida.

* See also 1864, 1869, 1875, 1876, 1882-1890, 1892, 1896-1899, 1901-1903, 1907c, 1907f, 1986, 1989, 2006c, 2060, 2061, 2190, 2193, 2199, 2200, 2224.

2235. DEŠEVAJA, A. S. 631.531.17
Organic mercuric disinfection. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947,
No. 3, pp. 10-15, bibl. 11.
Organic mercuric compounds under the name Niuif 1 and Niuif 2 have been used satisfactorily for treating seeds of cereals and of certain garden crops against various diseases, e.g. *Alternaria* and bacteriosis of cabbage, *Alternaria* of carrot and of pepper, and bacteriosis of cucumber.
2236. TISDALE, W. B., BROOKS, A. N., AND TOWNSEND, G. R. 631.531.17
Dust treatments for vegetable seed.
Bull. Fla agric. Exp. Stat. 413, 1945, pp. 32 [received 1947].
The results of the first 5 years' trials in Florida on seed dusting some 20 different types of vegetable with various proprietary substances against seed decay and post-emergence damping-off caused mainly by *Rhizoctonia* and *Pythium* are here recorded. In general it was found that seed of low viability benefited most by treatment. Comparatively low soil temperature and high soil moisture were found to increase the difference in germination between treated seed and controls. Large amounts of organic matter ploughed in shortly before sowing favoured seed decay and damping off. On the other hand, the effect of certain chemicals, especially Cuprocid, was less on sandy soils poor in organic content and with a pH value below 6.0. Greenhouse tests indicated that seed decay and post-emergence damping-off may be due to the same fungus, while field tests showed that different fungi or different strains may be involved in both phases of the disease. On the whole it was found that the chemicals used are effective for the control of seed decay but unsatisfactory against post-emergence damping-off.
2237. FAULKNER, R. P. 631.8: 634/635
The horticultural application of fertilizers.
Gdnrs' Chron., 1947, 121: 6, 18, 30, 42, 52-3, 62, 72, 82, 92, 102-3, 112-13, 122, 130, 140, 148, 158, 168-9, 178, 188-9, 200, 210-11, 220-1, 230-1, 238; 122: 4, 12.
A discussion of both the basic principles and practice of fertilizer, manure and compost application and of the action and sources of the several nutrients. The nutrient requirements of individual outdoor and glasshouse crops, including flowers, are separately considered.
2238. HEWITT, E. J., AND STANTON, W. R. 631.8: 635.1/7
Placement experiments in the use of fertilisers.
Progress report 1945 and 1946.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 43-9, bibl. 1.
A second report on work started in 1944 (*H.A.*, 15: 1676). Transplanted crops (tomato, cauliflower and leeks) consistently benefited from the use of liquid starters, while seeded crops (beetroot, lettuce and peas) did not respond to starter solutions but gave improved yields with broadcast dressings. The increase in early yields of tomatoes obtained in 1944 by applying a starter to seed boxes a week before transplanting was not confirmed.
2239. WITTWER, S. H., SCHROEDER, R. H., AND ALBRECHT, W. A. 635.1/7: 631.8
Interrelationships of calcium, nitrogen, and phosphorus in vegetable crops.
Plant Physiol., 1947, 22: 244-56, bibl. 37.
Spinach, Swiss chard, lettuce, tomato and tampala (*Amaranthus gangeticus*), supplied with varying levels of Ca, N, and P, were grown in colloidal clay/sand or colloidal clay/vermiculite; these media have the advantage that each nutrient may be varied without alteration of osmotic pressures. Balance of the nutrients was more important for growth than their absolute amounts.—*Missouri agric. Exp. Stat.*
2240. HEWITT, E. J. 635.1/7: 631.415.1: 546.711
The resolution of the factors in soil acidity: some effects of manganese toxicity.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 50-61, bibl. 14.
The typical appearance of plants growing in acid soils was reproduced in sand cultures in cauliflower, savoy cabbage, rape, swede and potato with appropriate combinations of calcium and manganese. Unusual symptoms seen in potatoes growing in an acid soil were reproduced by a combination of potassium and calcium deficiency with manganese toxicity. Increase of soluble calcium in the nutrient depressed the accumulation of manganese in the tissues and reduced the severity of the visual symptoms of toxicity. An appendix gives details of (a) symptoms observed in sand cultures—manganese toxicity, calcium deficiency complex—on savoy cabbage, cauliflower, potato and tomato, and (b) field symptoms observed in acid soils—manganese toxicity, calcium deficiency complex—on potato, cauliflower, savoy and swede.
2241. JOHNSON, J. 581.11: 632.4
Water-congestion and fungus parasitism.
Phytopathology, 1947, 37: 403-17, bibl. 6.
Water-congestion occurs most readily in plants grown outdoors in sandy or sandy-loam soils low in potash. It is sufficient, for experiments, to expose greenhouse grown seedlings to outdoor environment for 5-10 days before transferring them to the moist chamber. Marked differences in rate and amount of visible water-congestion occurred between varieties and sometimes between individual plants of the same variety. In some species water-congestion developed in an hour; in others, e.g. potato and sunflower, no visible water-congestion was obtained in the moist chamber. Plants were inoculated with representative fungus pathogens and incubated in the moist chamber under conditions favourable for water-congestion; the water-congested plants were more predisposed to infection than those not water-congested. Susceptible varieties generally congested more easily than resistant varieties.
2242. HEUBERGER, J. W. 635.1/7: 632.952
"Specificity" of the metallic dithiocarbamates in the control of certain vegetable diseases.
Abstr. in *Phytopathology*, 1947, 37: 439.
In the dimethyl series, the zinc salt (Zerlate) was more effective than the sodium, calcium, iron (Fermate), copper, and lead salts for the control of early blight on tomato and potato. It was also more effective than the sodium, calcium, and iron salts for control of tomato anthracnose, and than the iron salt in controlling downy mildew on cucumbers. In the ethylene series the zinc salt was more effective than the iron salt for control of early blight and late blight on potato and tomato, for tomato anthracnose, and for downy mildew on cucumbers. The zinc and iron salts in the ethylene series were more effective than corresponding salts in the dimethyl series for control of early blight and late blight on potato and tomato and for downy mildew on cucumbers, but were slightly less effective against tomato anthracnose.
2243. BISSELL, T. L., AND DUPREE, M. 635.1/7: 632.7
Vegetable insect pests.
Bull. Ga Exp. Stat. 254, 1947, 21 pp.
The chief insect pests of vegetables in Georgia are described and illustrated, and measures for controlling them are outlined. Fourteen different insecticides are mentioned and the material that has given best results for each crop is suggested first. DDT is better than rotenone or other older materials for cabbage insects, onion thrips, pea aphid and potato insects. It is not so good as other insecticides for Mexican bean beetle, harlequin bug, and fall armyworm. It is a poison classed with lead arsenate when residues on marketed products are considered. It should not be used on plant parts to be eaten without peeling later than 30 days

before harvest. Cryolite is a good stomach poison for bean beetles, pickleworm, tomato fruitworm, and worms on cabbage and collards. By feeding tests it has been shown to be harmless to horses and cattle.

2244. BROOKS, J. W., AND ANDERSON, L. D. 632.951: 635.1/7

Toxicity tests of some new insecticides.

J. econ. Ent., 1947, 40: 220-8, bibl. 3.

The chief insecticides tested were benzene hexachloride, DDT and chlordane.* The tests were made mainly on vegetable pests.

2245. ANON. 632.721

Control of earwigs.

Tasm. J. Agric., 1946, 17: 346.

The European earwig (*Forficula auricularia*) is a troublesome pest of vegetables and flowers in parts of Tasmania. It attacks many vegetables and flowers. The following bait has been found to give good control if persevered with: sodium fluosilicate or sodium fluoride 12 oz., molasses 2 qts., bran 12 lb., water 6 qts. The poison is dissolved in the water, the molasses stirred in and finally the bran. The prepared bait, which should be moist but not wet, is broadcast among the plants in the late afternoon or early evening so as to be in a palatable condition during the night when the earwigs fly. Small scale tests with dahlias suggest that DDT dusts may prove extremely useful against earwigs.

2246. HASEMAN, L. 632.76: 635.1/7

Flea beetle damage to garden crops.

Circ. Mo. Agric. Exp. Stat. 260, 1943, pp. 2

[received 1947].

For the control of flea beetles weeds should be suppressed in the vicinity of the garden plot. In heavy infestations bordeaux mixture and lead arsenate should be promptly applied. A dust consisting of 1 part of lead arsenate and 5 parts of hydrated lime or flour can be used. On mustard and other leafy vegetables a non-poisonous insecticide containing pyrethrum or derris should be used. To protect cabbage, tomato, tobacco and other plants in the seedbed, the bed should be kept covered with cheesecloth, and when such plants are set out the tops should be dipped in a solution containing three tablepoonsful of lead arsenate to a gallon of water to protect them until they get a good start.

2247. LEASK, D. M. R. 633.491(411): 338

Crop costs studies, 1946. III. Potatoes.

Fmrs' Leaflet, Edinburgh and E. Scotland Coll.

Agric. (Econ. Dep.) 3, 1947, pp. 6-10.

Tables show the average cost of growing 1 acre of potatoes in 1946 and 1945. Information is given on varieties grown, preceding crops, rental values and size of fields.

2248. SAMUEL, G. G. 633.491

Seed potato certification in America.

Agriculture, 1947, 54: 257-9.

An account of the methods adopted in Canada and the U.S.A. to ensure the continued cultivation of healthy potato stocks. They are based on tuber indexing, tuber unit planting and the so-called Florida test. Tuber indexing. Here growers submit 300 large tubers. Each is numbered and one eye is gouged out and planted and the resulting plant is observed for any sign of leaf roll or mosaic. Multiplication plots are planted on the "tuber unit" system, whereby all the sets cut from one seed tuber are planted next to each other and then a gap left before putting in the sets from the next tuber. The Florida test takes place in Florida or one of the Southern States very early in the year. Samples are treated with ethylene chlorhydrin to break dormancy and promote early sprouting, and are then planted in fields of such a size that all the tubers in one sample are in one drill. Growth is rapid and very frequent spraying is carried

out to protect from blight. The results are received back in a northern State well before planting time.

2249. MAINE AGRICULTURAL EXPERIMENT STATION. 633.491(741)

Potatoes.

Reprinted from *Bull. Me agric. Exp. Stat.* 449,

1947, pp. 261-377.

A research progress report, covering the 1946 crop season, in which the following are discussed: (1) Diseases and pests: (a) Control of late blight and early blight. DDT reduced the injury to the plants caused by bordeaux and tri-basic copper sulphate sprays, and gave good control of flea beetles and aphids. Benzene hexachloride caused some damage to the leaves, but gave good control of aphids. (b) Bacterial ring rot. No promising disinfectant has been found. (c) Leaf roll including net necrosis. DDT has its place in maintaining virus-free stocks, but of more importance is the control of waste land weeds that harbour aphids. (d) Control of insects by DDT. Early applications controlled first brood flea beetles; treatment throughout the season also controlled Colorado beetles and aphids, the treated plants remaining green and producing greater yields. (e) Translocation of DDT. No DDT could be found in tubers of sprayed plants. (2) Soil fertility. (3) Soil conservation. (4) Seed stock practices. (5) Haulm destruction. Petroleum fractions tested were generally less effective and more expensive than other haulm killers. (6) Irrigation. Water applied at the rate of one inch weekly during the growing season increased yields 74% due largely to an increase in the size of the tubers. (7) Variety tests. (8) Potato products: (a) Starch and alcohol. (b) Dried potatoes as stock feed. (9) Economics of the potato industry. Abstracts of published papers are given and there are numerous tables of data.

2250. LITTLEJOHN, L. J. S. 633.491(564.3)

Experiments with potatoes in Cyprus.

Emp. J. exp. Agric., 1947, 15: 195-205, bibl. 10.

The conditions under which potatoes are grown in Cyprus are described. Trials have shown that early varieties do not mature any earlier than main crop varieties and their yield is much less. Up-to-Date is consistently the best yielder. Experiments indicated that the yield from rose-ends is less than that from the normally used cut seed-pieces, and that no saving in the total amount of seed material would be gained by using rose-ends. Various methods of obtaining, for spring planting, seed with the dormancy broken are described, and the results of experiments show that it is relatively easy to obtain such seed. Various difficulties limit the application of such methods under peasant-farming conditions. The extent of "degeneration" of Cyprus potato stocks during the war years is described, and figures are quoted from experiments demonstrating that "degeneration" can be controlled by a system of field inspection and seed certification. [Author's summary.]

2251. BAKER, D. W. H. 633.491(669)

The potato in Nigeria.

Farm and Forest, 1946, 7: 72-4, bibl. 3.

After describing the wartime expansion of potato growing in Nigeria, which now almost supplies its own needs, the author concludes by suggesting that study of the Central American potato collection at Cambridge might result in the introduction to Nigeria of short-day types better suited to the tropics.

2252. LINTON, R. D. 633.491(678)

Observations on European potatoes in Tanganyika.

E. Afr. agric. J., 1947, 13: 19-22.

An account of a trial of 15 varieties of potato in the tropics (at 4,400 ft. a.s.l. and 5° S. lat.), primarily undertaken for observing their resistance to Irish, or late, blight (*Phytophthora infestans*). Nine were newly introduced from the

* A chlorinated hydrocarbon, formula $C_{10}H_6Cl_8$.

Scottish Society for Research in Plant Breeding, Corstorphine. The remaining six, all susceptible to blight, were of long standing in East Africa. The author places the varieties tested in the following order of merit, omitting the blight-susceptible varieties: 914b(52), 914a(91), 833b(98), 835a(4), 1256a(23), 834c(29), 931b(5), 653d(22) and 1253a(15). All the Corstorphine varieties remained completely free from Irish blight. Notes are given on other diseases present. It is stated that brown rot (*Xanthomonas solanacearum*) may prove to be the most difficult problem in potato growing at Lushoto.

2253. STEVENSON, F. J. 633.491-1.521
New varieties of potatoes.
Amer. Potato J., 1947, 24: 247-60.

Considerable detail is given of the characters of 34 new potato varieties distributed to growers in the U.S.A. since 1932 with notes on particular varieties from the different States.

2254. ROBB, W. 633.491(485)-1.52
Notes on plant breeding in Sweden.
Scot. Agric., 1947, 26: 151-7.

Includes references to the work on potato breeding carried out at Svalöf and to potato virus investigations conducted at the Swedish Institute for Plant Protection, Stockholm.

2255. V.S.V.V.S. (SALZMANN, R., AND OTHERS). 633.491(494)
Zehnter Tätigkeitsbericht der Vereinigung Schweiz. Versuchs- und Vermittlungsstellen für Saatkartoffeln (V.S.V.V.S.) vom 1 Juli 1944 bis 30 Juni 1946. (Tenth report of the Swiss seed potato society, 1st July, 1944, to 30th June, 1946), pp. 59.

Fresh outbreaks of wart disease have occurred in 4 parishes, but rigorous protective measures have practically suppressed the more than 290 outbreaks of the disease previously recorded. Colorado beetle infestations are still increasing, especially in west and north-west Switzerland. So far, only a few mountain valleys and the eastern part of the canton of Graubünden have remained free of the pest. Control measures, which have prevented extensive losses, consist of collecting the beetle and spraying with calcium arsenate or DDT.—The results of varietal trials in the years 1944-46 inclusive are summarized, while the variety tests carried out in 1945 are reported in detail in a 23-page appendix.

2256. CAIRASCHI, E. A. 633.491-1.521
Remarques sur l'isolement sanitaire pratiqué dans les cultures de pommes de terre sélectionnées. (Isolated plots for multiplying potato varieties.)
C.R. Acad. Agric. Fr., 1943, 29: 95-7 [received 1946].

Isolation belts of barley or buckwheat reduced the aphid population on the potatoes they guarded; the peach aphid was not found at all. Beans, lupins, and beetroot were less effective, and of the aphids taken on the potatoes guarded by these crops 90% were peach aphids. The author recommends the use of isolation belts of cereals, at least 10 m. broad on the windward side of the plot; for the first five years of selection, the potatoes should be sprayed with nicotine (0.1%) fortnightly while aphids are multiplying.

2257. PERLOVA, R. L. 633.491
The morphology of the berries as a taxonomic character of tuber-bearing species of *Solanum* L. (section *tuberosum* Bitt.). [Russian.]
J. Bot. U.R.S.S., 1946, 31: 2: 19-32.

Some of the leading investigators of the tuber-bearing species of *Solanum* have recognized the taxonomic value of the morphological characters of the berries. It may be noted that some of the species form berries only at high

altitudes. The author of the present article describes the berries of 42 species and botanical varieties of potato grown in the Pamir mountains, and reaches the conclusion that the morphological characters enable distinctions to be made even between sub-divisions of a species, including cytological races.

2258. CREPIN, C., AND BUSTARRET, J. 633.491
Quelques problèmes de l'amélioration de la pomme de terre. (Improving potatoes.)
C.R. Acad. Agric. Fr., 1941, 27: 1014-24 [received 1947].

Discusses the raising of improved varieties of potato with particular reference to blight resistance and the Colorado beetle.

2259. DRIVER, C. M. 633.491: 581.143.26.03
Vernalization of seed potatoes.
Agriculture, 1947, 54: 296-8.

A single year's trials at Cambridge with Epicure and King Edward potatoes showed no significant difference in yield results as between potatoes submitted to the normal English practice of chitting (setting in open trays, sprout-end uppermost in cold greenhouse for 25 days) and those submitted to vernalization, i.e. laid on the soil in the open in a single layer and left thus for 25 days. It is suggested that this vernalization process may be more practicable for the small grower who has not facilities for chitting.

2260. JORET, G., AND MALTERRE, H. 633.491
Influence de la grosseur du plant sur le rendement des pommes de terre. (Influence of size of plant on the yield of potatoes.)
C.R. Acad. Agric. Fr., 1941, 27: 1025-8 [received 1947].

Experiments were carried out with potato sets (var. Bintje) of four different average sizes, viz. 25 × 35, 30 × 45, 40 × 50, 65 × 80 mm. The best plants and highest yields were obtained from the two sets of medium sized tubers.

2261. MARENKIN, F. S. 633.491
The summer planting of newly-gathered potato tubers. [Russian.]
Agrobiologija (Agrobiology), 1946, No. 2, pp. 71-4.

The yield of potatoes in Tadzhikistan is low because the excessive heat of summer, during the formation of tubers, causes degeneration which renders such tubers unfit for seed. Lysenko has devised a method whereby tubers are planted in late autumn or the following spring and harvested in summer. The new crop of tubers is then laid in trenches between layers of peat or sand, and thoroughly watered. When the sprouts are long enough, the tubers are planted while it is still summer, the formation of new tubers taking place when the hottest weather is past, and the crop is harvested in late autumn. The difficulty of keeping seed tubers, lifted in autumn, in a fit state for planting in the following summer is thus overcome.

2262. MONTALDO, A. 633.491
Observaciones sobre el periodo de reposo de la papa. (Dormancy in the potato.) [English summary 1 p.]
Agric. tec. Chile, 1946, 6: 93-108, bibl. 10.

Tubers of 144 potato varieties, introduced, local and seedling, were stored from April to September, 1946. Of them, 31 showed prolonged dormancy—the tubers were still firm and sprouts were few and short. Lenticel frequency and early growth in the field were independent of length of dormancy. The author points out that some varieties store well enough for commercial use; and that where dormancy must be induced the use of the methyl ester of naphthaleneacetic acid is preferable to cold storage, which calls for costly imported equipment and reduces the quality of the product by sugar formation.—Puerto Octay, Chile.

2263. TOWNSEND, G. R. 633.491-1.53
The ammonium thiocyanate treatment for hastening the sprouting of dormant Bliss Triumph potatoes.
Proc. Fla. St. hort. Soc., 1945, pp. 236-7, bibl. 3.
The ammonium thiocyanate treatment is recommended because it gives as good, or better, results than ethylene chlorhydrin, is more convenient to use, and is safer.
2264. FOURMONT, R. 633.491-2.56
Utilisation du gaz sulfureux pour le dégermage des pommes de terre. (Sulphur dioxide to inhibit sprouting in potato tubers.)
C.R. Acad. Agric. Fr., 1943, 29: 221-3 [received 1946].
Potato eyes may be withered without damage to the tuber by the action of sulphur dioxide; two treatments may be necessary during storage. Seventeen other chemicals were tried.
2265. LEPIGRE, A.-L. 633.491
Essais d'égermage des pommes de terre par les vapeurs d'oxyde d'éthylène, 2e note. (Tests of bud destruction in potatoes by ethylene oxide gas, 2nd note.)
Ann. Inst. agric. Algér., 1946, 3: 115-35.
The first note on this subject appeared in the *Annales* for 1945. This second note verifies the earlier hypothesis that ethylene oxide treatment brings about the destruction of buds, in the majority of cases, in a rapid, efficacious and economical manner.
2266. BALD, J. G. 633.491-1.532.2
The treatment of cut potato setts with zinc oxide. I. Condition of the setts, growth, and yield.
J. Coun. sci. industr. Res. Aust., 1947, 20: 87-104, bibl. 4.
An analysis is made of data from a field trial on the effects of treating cut potato setts with zinc oxide before planting. Properly used zinc oxide reduced premature rotting of the cut setts, encouraged rather than hindered suberization, had little effect on the leaf-area of the plants and had slight effects on total yield. The most efficient zinc oxide treatment had no effect on emergence. Zinc oxide dip efficiently applied increased the over-all growth of the plant by protecting the setts from premature rotting. [From author's summary.]
2267. LUCKWILL, L. C. 664.84.21: 577.17
The use of growth substances to inhibit the sprouting of potatoes in storage.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 79-84, bibl. 3.
Sprouting of potatoes stored in boxes or sacks in a cool barn, or in field clamps, was inhibited by methyl ester of alpha-naphthaleneacetic acid (MANA) in a suitable carrier (shredded newspaper or talc). A range of $\frac{1}{4}$ to 3 oz. per ton appears to be suitable, the rate depending on the season of treatment and the length of time the potatoes are to be stored. Autumn applications at high rates are not considered economical, but spring treatment might be justified, especially for the domestic consumer, by the resulting improvement in quality towards the end of the season.
2268. JAKUSKIN, I. V. 633.491
Potato propagation without setts. [Russian.]
Ogiz, Seljhozgid, Moscow, 1945, 30 pp., 50 kop. [received 1947].
The greater part of the pamphlet is devoted to explaining how to extract the eyes from potatoes, induce them to form sprouts and roots, set the resulting plants out in the field, and thus obtain a larger and earlier yield of potatoes than by the usual method of planting whole or half tubers. Each eye produces a separate plant, and denser planting is therefore possible. Thinning out in summer yields a
- crop of early potatoes, and in its effect on the rest of the crop is tantamount to an increase of about 75 centn. per ha.
2269. MAKSIMOV, N. A., AND TURECKAJA, R. H. 633.491
The rooting of potato cuttings in relation to their age. [Russian.]
Sovetsk. Bot., 1947, 15: 33-6.
Cuttings were taken from base, tip, and intermediate portion of potato stems. Some of the cuttings were put in a rooting medium without preliminary treatment, others were first treated with indolylbutyric acid. Lorch, Epicure, and Katahdin were the varieties used in the experiment. It was found that cuttings from the upper, physiologically younger, parts of the stems were the readiest to form roots.
2270. JORET, G., AND MALTERRE, H. 633.491-1.84
Observations sur l'action de la fumure azotée dans la culture de la pomme de terre. (Nitrogenous manuring of potatoes.)
C.R. Acad. Agric. Fr., 1943, 29: 118-20, bibl. 1 [received 1947].
The authors conclude that the potato efficiently transforms mineral nitrogen to edible protein.
2271. DADYKIN, V. P. 633.491-1.8
The effect of mineral fertilizers on the yield of potatoes on the cultivated soils of the Kola Peninsula. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947, No. 2, pp. 30-6, bibl. 5.
The cultivated podzols of the Kola Peninsula, though they are becoming more fertile in comparison with virgin and recently tamed in soils, require further regular applications of both organic and mineral fertilizers, particularly N, to ensure successful yields. The necessary phosphorus can be obtained by applying phosphatic fertilizer the previous year. The need for potash is not clearly shown. Its omission does not lead to a great reduction of crop and increasing the amount of K shows no positive effect. The yields with the combinations NP and NK are about equal on these soils and approximate to that obtained with NPK, a result not observed on plots newly taken in. The chief effect of NP or NK depends on the form of the nitrogen fertilizer. With ammonium compounds the effect is greater with NK, with nitrate NP is the more effective. Under the conditions of the trials (and generally in the northern regions) there is a decrease of the starch content of the tubers as a result of the low temperatures at the end of the growing season and partly because of the high chlorine content of the soil. Potato tubers in the north are characterized by low N content, which can be increased by applying more N. The omission of K increases the accumulation of N in the tubers.
2272. COIC, Y. 633.491-1.8-2.8
Action de la fumure minérale sur les maladies de dégénérescence de la pomme de terre. (The action of artificial manures on the virus diseases of the potato.)
C.R. Acad. Agric. Fr., 1943, 29: 183-4, bibl. 1 [received 1947].
Experiments at the Station Central d'Agronomie in 1941 and 1942, using a 9-9-18 manure, showed no manurial effect on the transmission or symptoms of leaf roll, but an improvement in the yields of both healthy and diseased stands,
2273. WALLACE, T., AND OTHERS. 633.491-1.415-1.18
Some effects of lime and fertilizers on potatoes on a strongly acid soil as determined by visual symptoms and chemical tests.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 61-6, bibl. 2.
On the unlimed plots calcium deficiency and manganese

toxicity were the main problems, but deficiencies of magnesium, potassium and phosphorus also occurred in association with the different manurial treatments given. Liming corrected the deficiency of calcium and the toxicity of manganese, but on the limed area it was shown that treatments with fertilizers were necessary to correct deficiencies of magnesium, potassium, phosphorus and nitrogen. The mineral status of the plants was well shown by visual symptoms and by full chemical analysis and tissue tests, and the results by the three methods showed good agreement. It is suggested that a combination of the three methods will be valuable in examining problems of crop production on acid soils. [From authors' summary.]

2274. BELL, G. D. H. 633.491

Crops and plant breeding.

J. roy. agric. Soc., 1946, 107: 1-15, bibl. 21.

Chapter 6 of this review concerns potatoes and briefly deals with some cases of calcium, magnesium and nitrogen deficiencies, recently observed and controlled. The occurrence of "sports" in potato stocks is also discussed.

2275. POLLARD, A., KIESER, M. E., AND CRANG, A. 633.491

Factors affecting quality in potatoes. III.

A.R. Long Ashton Res. Stat. 1946, 1947, pp. 158-67, bibl. 6.

Particular attention was given to blackening of potatoes on boiling (see also *H.A.*, 15: 1706; 16: 2034). Correction of soil deficiencies produced an improvement in potato quality and the correction of K deficiency improved the colour of the cooked tubers. Where poor quality was not directly due to mineral deficiencies, fertilizers gave little improvement in quality. Muriate of potash as a source of K lowered the dry matter content of the tubers, producing poorer appearance and texture on some sites. Where K was low, N gave some increase in blackening but the effect was not general. Lack of N was associated with excessive breakage of the cooked potatoes. In field trials phosphate improved the texture of the samples and this was greatest where K was adequate. Varietal blackening varied with the sites.

2276. WEST, W. J., AND WRIGHT, S. J. 633.491-1.55

Root harvesting.

Scot. Agric., 1946, 26: 33-9.

Includes a two-page discussion of machinery for potato harvesting.

2277. WILSON, A. R., AND BOYD, A. E. W. 633.491-2.95

Potato haulm destruction—recent developments.

Agriculture, 1947, 54: 201-5.

A number of substances have now proved their worth in addition to sulphuric acid. Thus sodium chlorate can be recommended for end of season use, while one of the tar-acid compounds will more effectively kill vigorous haulm. The necessity for getting adequate coverage is stressed. Notes are given on the possible use of such other compounds as copper salts, calcium cyanamide, dinitro compounds and tar-oil winter washes.

2278. MAIN, A. D. C., AND GRAINGER, J. 633.491-2.95

Potato haulm burning with sodium chlorate.

Scot. Agric., 1947, 27: 14-17.

This is a report of effective blight control in potatoes, as carried out at Windyedge, Perth, with the emphasis on haulm destruction. For this purpose sodium chlorate, which is non-corrosive, has been successfully used as a substitute for the sulphuric acid treatment, which is in many respects undesirable. The chemical was applied at a concentration of 1.2%, at a rate of 100 gal./a. It requires about 6 days for complete killing, but this delay does not interfere with blight control, as the leaves become moribund almost immediately. The potatoes must not be lifted until at least 14 days after the haulms are destroyed. It is a great advantage for harvesting by elevator digger that

haulms killed with sodium chlorate remain erect, whereas those burned with sulphuric acid fall over. An efficient pump was found to be even more important than for the application of protective sprays. Eventually a Mono type D.3 was obtained, which gave the desired results.

2279. VASUDEVA, R. S. 633.491-2.8

Studies on the virus diseases of potatoes in India.

III. Occurrence of *Solanum virus 3*.

Ind. J. agric. Sci., 1946, 16: 206-8, bibl. 2.

Four types of symptoms on two potato varieties are described and illustrated. The reactions on differential hosts and the properties of the virus show it to be *Solanum virus 3*.

2280. HARRIS, M. R. 633.491-2.8

Accuracy of the ultraviolet light method in selecting potato tubers free of virus.

Amer. Potato J., 1947, 24: 179-83, bibl. 11.

No consistent correlation was established between fluorescence and the presence of leaf roll virus in the tuber.

2281. GIDDINGS, N. J. 633.491-2.8

Some studies on curly-top of potatoes.

Abstr. in *Phytopathology*, 1947, 37: 361.

Seedling potato plants were inoculated in the greenhouse with curly-top virus and 43% of the plants became infected. Commercial potato field tests, of plants suspected of having curly top, have been negative in every instance so far, and there has been no evidence of significant yield differences between inoculated and non-inoculated plots.

2282. TAKAHASHI, W. N., AND RAWLINS, T. E. 633.491-2.8

An electron microscope study of two strains of potato X virus.

Abstr. in *Phytopathology*, 1947, 37: 364.

The similarity in appearance of the two strains when studied with the electron microscope is in agreement with the idea that mutations are frequently not accompanied by detectable changes in the appearance of the virus particle.

2283. BALD, J. G., NORRIS, D. O., AND HELSON, G. A. H. 633.491-2.8

Transmission of potato virus diseases. 5. Aphid populations, resistance, and tolerance of potato varieties to leaf roll.

Bull. Coun. sci. industr. Res. Aust. 196, 1946, pp. 32, bibl. 16.

Preliminary to starting on a breeding programme for leaf roll resistance in potatoes the authors made observations on aphid behaviour and on the reactions of popular varieties to infection. Neither of the leaf roll vectors, *Myzus persicae* or *Macrosiphum gel*, showed any varietal preferences, but *M. gel* was found to avoid plants severely stunted by the virus. In north-western Tasmania and in a number of other potato-growing regions this aphid is the chief vector. In such areas the disease spreads much less in intolerant varieties, e.g. Bismarck, because the vector will not feed on stunted plants. With intolerance Bismarck combines the highest resistance to leaf roll of all varieties tested; according to the index of resistance worked out it is 7-8 times as resistant as the very susceptible variety Up-to-Date. Statistical consideration shows that at a point where a Bismarck field would retain a steady 10% of infected plants, infection in Up-to-Date would rise from 10% to over 95% after two years.

2284. MÜNSTER, J. 633.491-2.8-2.753

Aggravation de la dégénérescence de la pomme de terre en rapport avec une forte invasion du puceron gris du pêcher (*Myzus persicae* Sulz.) au cours de ces dernières années. (Increase in degeneration diseases of the potato in relation to severe infestation by the peach aphid in recent years.)

Rev. romande Agric. Vitic. 1945, 1: 9: 1-3 [received 1947].

The life history of the peach aphid is described and figured,

and its role as the vector of potato viruses is discussed. The peculiarities of altitude and climate of Switzerland make it particularly suitable for producing healthy seed potatoes.

2285. CAIRASCHI, E. A. 633.491-2.8-2.753
Observations sur les facteurs de pullulation des pucerons-vecteurs de maladies à virus de la pomme de terre. (The factors associated with the increase in numbers of the aphid vectors of the virus diseases of potato.)

La pullulation des pucerons-vecteurs de maladies à virus de la pomme de terre en 1943. (Increase in numbers of the aphid vectors of the virus diseases of potato in 1943. Practical results in relation to sanitary measures.)
C.R. Acad. Agric. Fr., 1944, 30: 314-16, 316-17 [received 1947].

Two short articles on observations on the aphid populations of potatoes with reference to the raising of disease-free tubers.

2286. CAIRASCHI, E. A. 632.753: 633: 491: 632.8
Observations sur divers pucerons nuisibles. (Observations on certain noxious aphids.)
C.R. Acad. Agric. Fr., 1942, 28: 414-6, bibl. 3 [received 1947].

Notes on the aphid vectors of the virus diseases of the potato, *Macrosiphum* *gei*, *M. solani*, and *Myzus persicae*, and on the pea aphid, *Illinoia* (*Macrosiphum*) *pisi*.

2287. STRINGER, A. 633.491-2.753
A note on the resistance of *Solanum polyadenium* to aphids.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 88-9.

The factors involved in the immunity of mature leaves of *Solanum polyadenium* to aphid attack may be the repellent action of the free oil present on the plant surface and the mechanical effect of the accumulation of gum by the insect, which is thus unable to feed.

2288. COIC, Y. 633.491: 581.192: 632.8
Influence de la maladie de l'enroulement sur la composition chimique du tubercule de pomme de terre. (The chemical composition of potato tubers as affected by leaf-roll.)
C.R. Acad. Agric. Fr., 1943, 29: 224-6 [received 1947].

Leaf-roll decreases the starch content, and increases the nitrogen content (protein-N and soluble-N) of the potato, and therefore considerably increases the ratio of total nitrogenous substances to starch.

2289. LIMASSET, P. 633.491-2.8
La mosaïque chronique des pommes de terre de la variété Royal Kidney. (The chronic mosaic of the Royal Kidney potato.)
C.R. Acad. Agric. Fr., 1943, 29: 61-3, bibl. 2 [received 1947].

From inoculation experiments using a virulent strain of virus X (type S) and normal Royal Kidney with slight mosaic for the double inoculation of White Burley tobacco, the author concludes that an attenuated strain of X is responsible for the chronic mosaic of Royal Kidney. It is hoped that a technique for immunization may be developed.

2290. WILSON, R. D. 633.491-2.8
Spotted wilt disease of potatoes.
Agric. Gaz. N.S.W., 1947, 58: 263-5.

The recent outbreak of spotted wilt in some sections of the Tableland potato growing areas in New South Wales has been very serious because it has resulted in rejection for certification of many crops which, in other respects, were of extremely high standard. In this disease black or brown dead spots varying in size and shape, but frequently almost

circular, appear first on the younger leaves. Sometimes there is a browning or blackening along the veins and there may be blackening, wilting and death of the shoots. The virus is carried from infected to healthy plants by thrips as in spotted wilt of tomatoes and a large number of other plant species, including vegetable and field crop plants such as tomato, potato, tobacco, pepper and lettuce, as well as certain garden flowers and many weeds. As the disease is carried over in the tubers, certified seed should be used.

2291. LUTZ, L. 633.491-2.3/4
Sur la dégénérescence gommeuse des tubercules de pomme de terre. (Gummosis of potato tubers.)
C.R. Acad. Agric. Fr., 1940, 26: 664-8 [received 1947].

The disease of potato tubers described is characterized by a shrinking and folding of the skin. In cross section affected tubers are brown and shiny towards the exterior and hollow in the middle, the space being lined with white mycelium. Slightly affected tubers are mottled with brown and have a tendency to turn black rapidly when cut across. Some of the tubers when cut and plunged into hot water exuded an insoluble brown gum at those places where the peripheral tissues were brown and shiny. Microscopic examination showed that at those places the cell walls had undergone gummosis, the starch grains remaining intact. From diseased tissues two organisms were isolated, one conforming to *Bacillus solaniperda*, the other a *Fusarium* with morphology approximating to that of *F. caeruleum*. Infection failed when these organisms were inoculated separately into tubers, but mixed inoculations resulted in typical lesions. Control measures suggested are the removal and destruction of affected tubers, the rest to be treated with formaldehyde solution to kill superficial mycelium. Precautions to be observed in the field and at planting are rotation of crops, burning diseased tubers, and the disinfection of the seed potatoes with a copper preparation.

2292. STARR, G. H. 633.491-2.3
The longevity of *Corynebacterium sepedonicum* on potato bags when placed under different environmental conditions.
Amer. Potato J., 1947, 24: 177-9.

Ring rot bacteria remained viable for 7 months on burlap bags tied in bundles and stored either indoors or outside.

2293. STARR, G. H. 633.491-2.3
Steam sterilization to kill potato ring-rot bacteria on burlap bags.
Amer. Potato J., 1947, 24: 231-3.

Satisfactory sterilization of 100-lb. burlap bags was achieved by treatment in an autoclave: 10 bags loosely rolled at 5 lb. pressure 20-30 minutes, and at 10 lb. pressure 20 minutes, or 40 bags tightly rolled at 5 lb. pressure 30 minutes and at 10 lb. pressure 20 minutes.

2294. BLACK, W. 633.491-2.411
Blight resistance in potatoes.
Agriculture, 1947, 54: 198-200.

There are three known strains of the fungus *Phytophthora infestans*. No variety of potato immune to all three has as yet been introduced into commerce, but a seedling unaffected by two of them has been approved in official trials. It is a variety known as Craig's Bounty and was bred from *Solanum demissum*.

2295. BLACK, W., AND HAIGH, J. C. 633.491-2.411
Strains of potato blight in Scotland.
Scot. Agric., 1947, 27: 49-50.

In order to determine whether strains of potato blight other than strain A occur in commercially grown potatoes, test inoculations were carried out with infected material from 25 counties. In 38 cases the common strain A only was present, while in a 39th case the seedling 914b (52) bred

from the species *Solanum demissum* was shown to harbour strain B.—Scottish Plant Breeding Station.

2296. THUNG, T. H. 633.491-2.4

Potato disease and hybridization.

Phytopathology, 1947, 37: 373-81, bibl. 24.

Previous work on hybridizing potatoes is reviewed with particular reference to obtaining varieties resistant to blight (*Phytophthora infestans*). In Java the wilt disease (*Bacterium solanacearum*) is more important than blight. The two diseases present different problems; the main problem for temperate zones is immunity from blight, in Java from wilt disease. The work in Java on hybridizing *Solanum* species and hybrids is described.—Instituut voor Plantenziekten, Buitenzorg, Java.

2297. BHAGWAGAR, P. R. 633.491-2.4

Early-blight of potato in India.

Ind. J. agric. Sci., 1946, 16: 296-301, bibl. 13.

Isolations of *Alternaria* were made from potatoes in four areas. Tests indicated that the Simla strain was highly pathogenic while those from Ootacamund, Naini and Pusa were weak parasites. Early-blight is not caused solely by *Alternaria solani*, but can also be caused by another species, possibly *A. tomat*.

2298. RUBIN, B. A., ARCIHOVSKAJA, E. V., AND PROSKURNIKOVA, T. A. 633.491-2.411

Oxidizing changes of phenols and their relation to the resistance of potatoes to *Phytophthora infestans*. [Russian, English summary 14 lines.]

Biohimija, 1947, 12: 141-52.

Potatoes of the variety 12994, highly resistant to blight, have a higher respiration rate and peroxidase activity than those of the susceptible variety Courier. The infection of potato leaves by *Phytophthora infestans* causes increased oxidation in the system polyphenols-poly-phenoloxidase, the increase being greater for the resistant than for the susceptible variety. It seems possible that these changes exercise a protective function when leaves are infected by *Phytophthora*.

2299. CASTBERG, C., AND EMILSSON, B. 633.491-2.952

Undersökningar beträffande bekämpning av bladmögel och brunröta hos potatis. I. Preliminära bestämningar av den kvarsittande förmågan hos kopparhaltiga besprutningsmedel. (The control of late blight in potatoes. I. Preliminary studies on the spray retention of copper fungicides.) [English summary $\frac{1}{2}$ p.] *J. roy. Swedish Acad. Agric.*, 1947, 86: 196-204, bibl. 4.

The absolute copper retention of a 2% bordeaux spray on potato leaves was found to be considerably higher than that of other copper fungicides, such as cuprous oxide, copper-oxychlorides or copper silicate used at normal concentrations. This is largely due to the higher copper content of bordeaux, but partly also to the higher relative retention of this fungicide. Bordeaux mixture is therefore regarded as the superior spray, especially under wet conditions.—Institute for Plant Investigations and Cold Storage, Nynäshamn.

2300. LITTAUER, F., PALT, J., AND MOELLER, S. 633.491-2.411

Potato blight control in Palestine.

Palestine J. Bot. (R), 1946, 5: 186-201, bibl. 10.

A sketch of the seasonal and regional distribution of *Alternaria* and *Phytophthora* blights in Palestine and a report on the 1941-43 spraying trials. Satisfactory control was obtained by spraying with bordeaux 1%, Perenox $\frac{1}{2}$ % and Floridan 2%.

2301. CHORIN, M. 633.491-2.421.1

The powdery mildews of potatoes in Palestine.

Reprint *Palestine J. Bot. (R)*, 1946, 5: 259-61.

Two powdery mildews affect potatoes in Palestine, one of

them an *Oidium*, the other an *Oidiopsis*. The main difference in the symptoms is that *Oidium* first causes browning of stalks and veins, then a whitish coherent covering of both leaf surfaces, while *Oidiopsis* appears in the form of dispersed spots with a greyish covering on the underside of leaves. The geographical and seasonal distribution of the *Oidium* indicates that the disease is restricted to conditions of low humidity.

2302. WOOD, J. 633.491-2.651.3

Potato root eelworm—a survey in Holland (Lincs.).

Kirton agric. J., Sept. 1946, No. 11, pp. 43-8.

A survey of the position indicates the necessity for early detection, for widening the rotation to a 6-year one and for preventing spread by not using seed from infested land. There is no quick road to elimination.

2303. TODD, A. R. 633.491-2.651.3

The potato eelworm hatching factor.

Food, 1947, 16: 274-5.

Work at Cambridge has shown that the hatching of dormant cysts of *Heterodera rostochiensis* in the neighbourhood of solanaceous roots is due to the production of a highly specific substance, "eclepic acid". Its composition has not been fully determined, but investigations led to the trial of anhydrotetroneic acid; this was effective in stimulating hatching, but only at 1,300 times the concentration needed with eclepic acid. (XIIth International Congress of Pure and Applied Chemistry.)

2304. RAUCOURT, M., AND TROUVELOT, B. 633.491-2.76

La lutte contre le doryphore: son importance dans la production de la pomme de terre. (Control of the Colorado beetle: its importance in potato culture.)

C.R. Acad. Agric. Fr., 1940, 26: 853-6 [received 1947].

In reviewing the Colorado beetle situation the author states that in France in a normal year about $1\frac{1}{2}$ million hectares have to receive one or two treatments. The amounts of insecticides used per hectare are, 1-2 kg. arsenic, 100 g. rotenone, or 8-10 kg. fluosilicate of barium.

2305. BERTOLA, M. 633.491-2.76

La lutte contre le doryphore. Greffage de la pomme de terre. (Control of Colorado beetle. Grafting potatoes.)

C.R. Acad. Agric. Fr., 1941, 27: 875-8 [received 1947].

It is suggested that one method of avoiding attacks of the Colorado beetle is to graft tomatoes on potatoes. The above-ground part is then resistant to Colorado beetle and yields a crop of tomatoes while the underground part produces tubers.

2306. BARATTE, J. 633.491-2.76

Sur l'amélioration possible des techniques de lutte contre le doryphore: emploi de poudrages arsenicaux rapides, efficaces et peu dangereux. (The control of Colorado beetle by arsenic dusts.)

C.R. Acad. Agric. Fr., 1941, 27: 939-41 [received 1947].

Describes the application of arsenical dusts to potato plants and discusses the advantages of dusts over wet sprays.

2307. RAUCOURT, M., AND BÉGUÉ, H. 633.491-2.76

Les produits antidoryphoriques en 1941 et 1942. (Control of Colorado beetle in 1941 and 1942.)

C.R. Acad. Agric. Fr., 1942, 28: 380-2 [received 1947].

Arsenate of lime is recommended to replace arsenate of lead and rotenone sprays in the control of Colorado beetle.

2308. RISLER, J. 633.491-2.76
La lutte contre le doryphore. Recherches
experimentales. Applications pratiques. (Control
of Colorado beetle.)
C.R. Acad. Agric. Fr., 1941, 27: 1112-20 [received
1947].

Laboratory experiments are described in which acid and alkaline solutions were used against Colorado beetle. The alkaline solutions giving promising results, they were used in field trials where they gave satisfactory control, a mixture of carbonate of soda and carbonate of ammonia at 2/1% being most effective.

2309. FEYTAUD, J., AND DE LAPPARENT, P. 633.491-2.76
A propos d'une formule alcaline préconisée pour
détruire le doryphore. (An alkaline formula
for controlling Colorado beetle.)
C.R. Acad. Agric. Fr., 1942, 28: 229-31 [received
1947].

The authors present results of laboratory trials with alkaline solutions against the Colorado beetle (see above, No. 2308). They find that (1) Sodium carbonate at 5% scorched potato foliage and had little effect on the beetle, (2) Ammonium carbonate at 5% caused slight leaf scorch and was no more effective than sodium carbonate, (3) A mixture of sodium carbonate and ammonium carbonate at 2 and 1% respectively caused marked scorching of potato leaves and was no more effective against the beetle than the carbonates used separately.

2310. RAUCOURT, M., AND BÉGUÉ, H. 633.491-2.76
Sur l'emploi de solutions alcalines contre le
doryphore. (Alkaline solutions for Colorado
beetle control.)
C.R. Acad. Agric. Fr., 1942, 28: 541-2 [received
1947].

In view of the contradictory results obtained by previous workers (see above, Nos. 2308-2309) the author carried out field trials with the solutions recommended by Risler, but results were unsatisfactory, being no better than in the controls in one experiment and only slightly better in another.

2311. DUPIRE, A., AND RAUCOURT, M. 632.951
Un insecticide nouveau: l'hexachlorure de
benzène. (A new insecticide: benzene hexa-
chloride [666].)
C.R. Acad. Agric. Fr., 1943, 29: 470-2 [received
1946].

The mixture of isomers is toxic to the Colorado beetle on potato.

2312. HASEMAN, L. 633.491-2.76
Prevent potato beetle damage.
Circ. Mo. agric. Exp. Stat. 262, 1943, pp. 2
[received 1947].

The stages of development and habits of the Colorado beetle and its control in gardens are briefly described. One part of lead arsenate mixed with 5 parts of lime or flour can be applied with a small dust gun or pepper duster when the dew is on, or, on larger plots, a regular duster can be used. For spraying mix 2 or 3 tablespoonfuls of lead arsenate with a gallon of water. The applications should be made two or three times weekly. Paris green or calcium arsenate may be used but they contain about twice as much arsenic, so only about half as much should be used as for lead arsenate.

2313. FERRIERE, C. 633.491-2.76
L'abondance des doryphores en rapport avec
la nature du terrain. (The populations of the
Colorado beetle in relation to soil conditions.)
Rev. romande Agric. Vitic., 1945, 1: 4: 1-2
[received 1947].

The Colorado beetle is most abundant on recent alluvial

or quaternary soils, sand and gravel mixed with clay, that is on horizontal situations at the bottom of valleys or on the sides of streams. It is less abundant on sandy clay or gravel from ancient moraines unless the ground is deep and humid. It is rare on soft sandstone or marly soils more or less clayey and shallow. A map shows the distribution of the zones in Switzerland.

2314. PUSSARD, P. 633.491-2.78
Sur la présence de la teigne de la pomme de
terre *Phthorimaea* (*Gnorimoschema*) *operculella*
Zell. dans le département des Alpes-maritimes.
(The potato tuber moth in the Alpes-maritimes
Department.)
C.R. Acad. Agric. Fr., 1941, 27: 1150-6, bibl. 4
[received 1947].

The distribution of the potato tuber moth in France is given and its appearance in the Alpes-maritimes Department in October 1941 is recorded. Good control was obtained by fumigating tubers with carbon bisulphide and with hydrocyanic acid.

2315. PUSSARD, R. 633.491-2.78
Documents pour la lutte contre la teigne de la
pomme de terre. (Control of the potato moth.)
C.R. Acad. Agric. Fr., 1944, 30: 96-7.

Measures for controlling the potato moth, *Phthorimaea operculella*, involve fumigating the tubers with carbon disulphide, and dusting with various insecticides, e.g. rotenone, pyrethrum, fluosilicates, etc. Experiments showed that the caterpillars could develop in the tubers of *Solanum demissum* and in the leaves of *Physalis viscosa*.

2316. WILSON, J. W., AND SLEESMAN, J. P. 633.491-2.95
The differential response of potato varieties to
spraying with DDT plus a fixed copper.
Amer. Potato J., 1947, 24: 260-6, bibl. 5.

Ten varieties were sprayed with copper oxychloride sulphate (COC-S) + DDT (4-1-100). Experimental data suggest that the response to spraying in these trials was more closely correlated with varietal susceptibility to disease than to insects. Yields were doubled, defoliation was halved and leafhopper and flea beetle damage was reduced to almost nil by this combined spray at Wooster.

2317. SCHRIBAU, —. 633.494
La topinambour, plante de guerre par excellence.
(The Jerusalem artichoke as a valuable wartime
plant.)
C.R. Acad. Agric. Fr., 1941, 27: 1075-88 [received
1947].

The data presented show that the yield per hectare of the Jerusalem artichoke is higher than that of the potato.

2318. NELLER, J. R. 633.5
Culture, fertilizer requirements and fiber yields
of ramie in the Florida Everglades.
Bull. Fla. agric. Exp. Stat. 412, 1945, pp. 40,
bibl. 6.

With an annual application of 500 lb./acre of a 2-6-36 artificial manure, ramie growing on peat could be cut up to four times a year; over five years the average annual yield of spinnable fibre was nearly a ton per acre, but the rate of decrease indicated the necessity of more N and P in the fertilizer. Extraction of the fibre was difficult during the wet season. The large yield of leaves, rich in protein, might be exploited.

2319. LAUMONT, P., RODDE, A., AND ROLLIN, L. 633.71
L'expérimentation sur tabac à la Station
Expérimentale d'Isserville au cours des cam-
pagnes 1943 et 1944. (Tobacco experiments at
Isserville Experimental Station in 1943 and 1944.)
Ann. Inst. agric. Alger., 1946, 3: 63-114.

This report is largely devoted to lengthy descriptions of varietal and cultural experiments. Amongst the few conclusions reached are the following: that the merits of a new variety should be judged not only on yield but mainly on monetary returns; that the selection Spada 11-15 is superior to all others tested.

2320. BAKER, D. H. 633.71

Cigarette tobacco in Northern Nigeria.

Farm and Forest, 1945, 6: 161-2.

A description of a small, local, native industry in air-cured cigarette tobacco (Virginia hybrid).

2321. DE GUERIN, B. C. 633.71

Tobacco is easy to grow.

Fruitgrower, 1947, 104: 40.

In the Channel Islands. Guernsey paid tax on over 8 tons of locally grown leaf in 1944. The plants are put out in April or May, and the first crop picked in August or September; one or two smaller pickings may be possible later.

2322. ABDUL HAMID BIN HAJI HUSSEIN. 633.71

Tembakau rachit.

Malay. agric. J., 1947, 30: 72-3.

An account of the method of cultivation and manufacture used by the Javanese smallholders of Kuala Langat, Selangor, for producing tembakau rachit, a finely sliced tobacco prepared for smoking in a wrapper made from leaves of the nipah palm. The crop is grown on peat, matures in three months and yields about 500 lb. of prepared tobacco per acre.

2323. ANTONENKO, V. 633.71

Production on collective farms, 1946. I. Plant-

ing tobacco and *Nicotiana rustica*. [Russian.]

Kolhoznoe Proizvodstvo (Collective farming),

1946, No. 1, pp. 28-9.

This is a popular article containing much practical information on growing seedlings and planting them out in the open ground in the spring. At the same time, some details are given of application of manure and fertilizers before and after planting. The paper is written by the chief agronomist of the Central Tobacco and *N. rustica* Board of the Ministry of Technical Crops of the U.S.S.R.

2324. STINSON, F. A. 633.71-1.8

Fertilising and cropping systems for flue-cured tobacco.

Better Crops with Plant Food, 1946, 30: 10: 21-7.

Ontario soils supported a two-year rotation of tobacco and rye, until organic matter was largely lost. The author recommends that the rotation be lengthened, and rye disced in as a green manure with N and K in the spring before the tobacco is planted.

2325. YÖRÜK, S., AND ÖZBAŞ, H. 633.71

Puruluk tütün üzerindeki çalışmalar. (Cigar

tobacco culture.) [German summary $\frac{1}{2}$ p.]

Inhisarlar Tütün Enstitüsü Raporlari, 1944, 3:

137-46 [received 1947].

The authors discuss the yield of cigar tobacco in Turkey, its characteristics, and the climate and soil suitable for it. The results of an investigation indicate that only round Rize will suitable tobacco thrive.

2326. AKKOYUNLU, Z., AND İPEKOĞLU, F. 633.71

Tütün çeşidlerinin standardlanmasına doğru.

(The standardization of tobacco varieties.)

[English summary 2 pp.]

Inhisarlar Tütün Enstitüsü Raporlari, 1944, 3:

99-112 [received 1947].

Describes the measures that are being taken in Turkey to maintain the purity of selected varieties. A coloured map shows the tobacco-growing districts in that country.

2327. AKKOYUNLU, Z. 633.71

Tömbeki üzerindeki çalışmalar. (Observations

on tombak tobacco.) [English summary $\frac{1}{2}$ p.]

Inhisarlar Tütün Enstitüsü Raporlari, 1944, 3:

113-36, bibl. 16 [received 1947].

After an investigation certain areas in Turkey are recommended as suitable for growing tombak, the tobacco smoked in a nargile pipe.

2328. SCHLOESING, A. T., AND LEROUX, D. 633.491-1.531

Essai de conservation des graines en l'absence

d'humidité, d'air et de lumière. (Storage of seed

in the absence of moisture, air, and light.)

C.R. Acad. Agric. Fr., 1943, 29: 204-6, bibl. 12

[received 1946].

Tobacco seed, stored for nearly 21 years over quicklime in sealed glass tubes at $\frac{1}{10}$ atmosphere, showed a germination of over 90%.

2329. HILLS, K. L., TRAUTNER, E. M., AND RODWELL, 633.71-1.541: 633.88.84.4

A tobacco-duboisia graft.

Austr. J. Sci., 1946, 9: 24-5, bibl. 4.

A tip cutting from a seedling of *Nicotiana tabacum* was grafted on to a rootstock of *Duboisia myoporoides*. Analysis after harvest made it seem reasonably certain that components of both the pyridine (nicotine) and tropane groups of alkaloids were present in the leaf of the grafted plant. This result is discussed.

2330. STEINBERG, R. A. 633.71

Suppression of axillary growth in decapitated

tobacco plants by chemicals.

Science, 1947, 105: 435-6.

In the commercial production of tobacco (*Nicotiana*) the plant is decapitated at the flowering stage ("topped") and later all subsequent axillary growth is removed at intervals ("suckering"). An inexpensive substitute for hand suckering was sought in the use of chemicals including growth regulating substances applied to the cut surface after topping. The chemicals produced various responses. Some were capable of suppressing axillary growth to the same extent as manual suckering and with as great or greater yield of leaf. Others produced general stimulation of leaf and stem. The data indicate that it may be economically feasible to employ chemical suppression of suckers in tobacco production. Field trials are in progress with Maryland tobacco and Rustica tobacco grown for nicotine. —Plant Ind. Station, Beltsville, Md.

2331. SMITH, T. E. 633.71

Hereditary defects in the T.1 448A tobacco and its

hybrids.

Phytopathology, 1947, 37: 424-6.

During the development of flue-cured strains of tobacco resistant to bacterial wilt, a parasitic disease (seedling blight, caused by *Olpidium brassicae*) and two hereditary defects have been observed on T.1 448A and its hybrids, showing that breeding for resistance to one disease may yield plants with increased susceptibility to others.

2332. BAWDEN, F. C., AND PRIE, N. W. 632.8: 633.71

The virus content of plants suffering from tobacco

mosaic.

Brit. J. exp. Path., 1946, 27: 81-90, bibl. 8.

Virus can be released from the leaf residues of plants suffering from tobacco mosaic by fine grinding or by incubation with either trypsin or the mixture of enzymes from snails' crops. Grinding causes loss of virus, and more virus is obtained if inoculation with trypsin precedes grinding than if the operations are reversed. Most virus is released by inoculation with the snail enzymes. [From authors' summary.]

2333. GIDDINGS, N. J. 633.71-2.8
Dodder as an aid in testing some plant species for curly-top virus.
Phytopathology, 1947, 37: 278-80.

Some plants are very unsatisfactory hosts for the beet leafhopper and the transmission of curly-top virus may be more easily effected by using dodder as an intermediary, for the leafhoppers feed well on dodder, and dodder thrives on such plants. Data are tabulated of virus transmission through dodder (*Cuscuta subinclusa*) to *Nicotiana tabacum* and *N. glutinosa*.

2334. RISCHKOV, V. L., AND SMIRNOVA, V. A. 633.71-2.8

The influence of electrolytes and of anaerobic conditions on necrotic response in *Nicotiana glutinosa*.

C.R. Acad. Sci. U.R.S.S., 1947, 55: 265-7.

Leaves of *Nicotiana glutinosa* were threaded on a wire which was fixed horizontally on a Koch dish so that one half of each leaf could be immersed in the solution of the compound tested or in water, while the other half remained above the surface of the liquid. Before the test the leaves were rubbed over the entire surface with a glass rod which had been wetted with the juice of a plant affected with mosaic. Leaves immersed in 0.1 M. solutions of KNO_3 , $Mg(NO_3)_2$, or a 0.01% solution of $ZnSO_4$ showed a reduced susceptibility to the virus of tobacco mosaic, and developed only an insignificant number of necroses. $Ca(NO_3)_2$ did not produce a similar effect. The accumulation of the virus of tobacco mosaic and the necrotic response of the leaves are to be observed in an atmosphere composed of 1 part of air and 15 parts of hydrogen. Accumulation of the tobacco mosaic virus can proceed under conditions of a greatly decreased partial pressure of oxygen.

2335. LIMASSET, P. 632.8: 633.71 + 635.64
Sur un effet du renforcement réciproque de l'action de deux virus dans une maladie complexe du tabac et de la tomate. (A reciprocal reinforcement of the action of two viruses in a complex disease of tobacco and tomato.)
C.R. Acad. Agric. Fr., 1944, 30: 472-3 [received 1947].

A new disease of tobacco is called by the author "pseudo-virilles" (false tendrils), the symptoms being a reduction of the surface to such a degree that the leaf assumes the appearance of a tendril. It is found to be caused by the interaction of two viruses, that of tobacco mosaic and cucumber virus 1, which separately are unable to produce the pronounced symptoms described.

2336. BRUNA, E. M. 633.71-2.4
Contribución al estudio de la "caída" de los almácigos de tabaco en Chile. (Damping-off of tobacco seedlings in Chile.) [English summary ½ p.]
Agric. tec. Chile, 1946, 6: 109-34, bibl. 35.

In *Aconagua Pythium debaryanum* is the main cause of damping-off of tobacco seedlings, which resist infection after the development of 4-6 leaves. The disease could be controlled by applying 0.6% copper sulphate solution at 5 l. per sq. m., or 1% formalin at 20 l. per sq. m.

2337. DOMINICK, C. B. 633.71-2.768
Tobacco flea beetle control.
Bull. Va. agric. Exp. Stat. 406, 1947, 19 pp.

Dust containing 1, 2 and 3% DDT prevented injury by the flea beetle, *Epitrix hirtipennis* Melsh., in tobacco plant beds. DDT used as a spray was also highly effective. Benzene hexachloride used as a dust or spray, also gave protection when the plants were ready to be transplanted but caused some injury to the plants at the concentration tested (1% gamma isomer). No plant injury was observed from the use of DDT dusts or sprays. Rotenone, cryolite and basic copper arsenate also reduced the beetle population.

2338. QUIDET, P. 633.71-2.951
Note relative à l'emploi des insecticides nouveaux dans le lutte contre les parasites du tabac. (New insecticides used against two tobacco pests.)
Prog. agric. vitic., 1947, 128: 26-7.

A short note on the control of click beetle larvae (wireworms), and the caterpillars of the owl-moth [*Agrotis ypsilon* Roff.]. DDT as a soil dressing has been found to give good results against the former, and as a spray or dust against the latter.

2339. CLARK, F., AND STOKES, W. E. 633.71-2.954
Controlling weeds in tobacco seedbeds.

Proc. Fla. St. hort. Soc., 1945, pp. 223-7, bibl. 3.

Uramon and calcium cyanamide were used successfully as herbicides.

2340. CUSSON, J. 633.79(443.83)
Le houblon en Alsace. (The hop in Alsace.)
Prog. agric. vitic., 1947, 128: 108-13.

An account of hop growing in Alsace with notes on cultural operations and varieties grown. Formerly the local variety Elsässer Landhopfen (the Alsatian hop) was grown almost exclusively. It is now being replaced by the more vigorous variety Striesselspalter, which is more resistant to diseases, and is better liked by the brewer.

2341. HOED, F. 633.79(493)
Culture houblonnière en Belgique. (Hop growing in Belgium.)
Ann. Gembloux, 1946, 47-52: 97-115.

A lecture outlining the decline of hop growing in Belgium during the last hundred years, and describing the formation of the Institut National Belge du Houblon. The programme of the Institute includes research on manures, trace elements, breeding and parasites. The multiplication of varieties and propaganda were also undertaken.

2342. BEARD, F. H., AND WILSON, D. J. 633.79-1.535
Propagation trials with hops. IV. Further trials in propagation by softwood cuttings.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 131-5, bibl. 4.

Further trials in the propagation of hops by softwood cuttings (*H.A.*, 16: 2044) are described. They confirmed that with basal shoot cuttings those made from shoots with some initial rooting give the best results, and that with all varieties treatment with a synthetic growth substance might be very harmful or at the best of little benefit. Lateral cuttings cut to a node were again superior to those with a heel, and again the application of a growth substance was not advantageous. The use of basal shoot cuttings in simple cold frames is practicable, but lateral cuttings, even of the superior nodal type, give a very poor yield of useful material. If this type of cutting is used, a more elaborate technique is needed.

2343. BEARD, F. H., AND WILSON, D. J. 633.79-1.535: 577.17
Propagation trials with hops. V. Further experiments in treating cuttings (strap-cuts) with growth substances.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 136-9, bibl. 1.

The trials described show that the variable results previously obtained (*H.A.*, 14: 1709) by treating hop cuttings with a growth substance cannot be attributed to the method of application, time of planting or strength of solutions used. Apart from some checking effect on early shoot growth the various treatments had no effect. Time of planting affected forwardness of growth (when measured in April), number and weight of sets produced. There were varietal differences in response to the time factor.

2344. BEARD, F. H. 633.79-1.535
Propagation trials with hops. VI. The effect of spacing cuttings (strap cuts) in the nursery rows on the number and size of sets produced.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 140-1.
In a trial of three distances of spacing cuttings (strap-cuts) in the nursery rows the percentage take and size of sets increased with wider spacing, whilst the greatest number of useful sets per acre of nursery was produced by close planting.
2345. WILKINSON, E. H. 633.79-2.3/4+2.8
Progress report on hop disease investigations in the West Midlands.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 100-4.
The hop diseases of most importance in the West Midlands are mosaic, nettlehead, split-leaf blotch, chlorotic disease and small hop disease; during the past four years the mild form (fluctuating) of *Verticillium* wilt has been found, but no case of the serious (progressive) form. Mosaic is now so prevalent that many growers in the area have replaced the susceptible Golding varieties by the tolerant Fuggle. Recommendations for the field control of mosaic are: (1) Cuttings of one-year-old roots (bedded sets) should be obtained from a disease-free clonal stock or from a commercial yard known to be free from mosaic. (2) Golding yards should be set as far as possible from tolerant varieties. (3) Only sensitive males should be planted in the yard. (4) Inspection of hopyards should be frequent and thorough. All plants showing symptoms of mosaic should be grubbed and burnt. If a few isolated stocks only are found it is a wise precaution to grub not only the infected plants but also the two stocks adjoining. Results obtained from experiments suggest that split leaf blotch is graft transmissible and is therefore most likely to be of virus nature.
2346. KEYWORTH, W. G. 633.79-2.8
Mosaic disease of the hop. A study of tolerant and sensitive varieties.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 142-8, bibl. 10.
The incidence of mosaic-carrier plants in commercial plantations of the Fuggle variety of hop in the Weald (Kent) and in the Teme valley (Worcs.) was tested by grafting experiments. The results showed that in each area at least 30% of the plants were mosaic carriers. Observations are also recorded of the incidence of mosaic disease in Golding hops planted near to Fuggles. The methods of testing the mosaic reaction of male hops and certain new seedlings are also described.
2347. TOLHURST, J. A. H. 633.79-2.8
Soil conditions in relation to nettlehead of hops in the West Midlands. Progress report, 1946.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 105-12.
From a survey of Fuggles hop yards on the Old Red Sandstone near Hereford it was concluded that (1) nettlehead has a tendency to occur in localized outbreaks, and spreads most rapidly along the rows, (2) there may be a correlation between such areas and certain soil types, (3) tissue tests show no correlation either between incidence of nettlehead and the content of nitrate nitrogen, phosphate, potassium, calcium and magnesium in the hop, or between soil types and nutritional status.
2348. KEYWORTH, W. G. 633.79-2.4
Verticillium wilt of the hop (*Humulus lupulus*). II. The selection of wilt resistant varieties.
J. Pomol., 1947, 23: 99-108.
Hop varieties have been selected for resistance to *Verticillium* wilt and tested in commercial gardens. Some of the Wye varieties and one variety bred on a commercial farm are markedly resistant, but none of the varieties tested is immune. The trials suggest that the selected varieties vary in their reactions to the disease on different farms, and it is possible that soil conditions or the appearance of new strains of *V. albovatrum* may cause a breakdown of resistance.—East Malling Research Station.
2349. KEYWORTH, W. G. 633.79-2.4
Notes on varieties of hop resistant to *Verticillium* wilt.
A.R. East Malling Res. Stat. for 1946, A30, 1947, pp. 157-9, bibl. 7.
The brewing and cultural characters of seven varieties of hop resistant to *Verticillium* wilt are described. The varieties OR55 and OJ47 appear likely to be the most generally acceptable.
2350. SOUTHEY, J. F. 633.79-2.6/7
A preliminary survey of the insects associated with hops in the West Midlands in 1946.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 112-6, bibl. 6.
The aim of the survey described was to gain information on insects that might be associated with virus diseases, particularly nettlehead and mosaic. The insects successively found on hop plants from April onwards are noted, and observations were made on those occurring on weeds and hedges around hopyards; it is possible that certain insects, common in the hedgerows and occasionally met with on hops might become pests under favourable conditions. The observations suggest that pest incidence might be reduced if growers would take care in selecting shrubs as wind-breaks and choose hawthorn instead of sloe or elm. Lines for further investigation of the hop fauna are suggested.
2351. MIDDLETON, J. T. 633.84-2.4
Root rot of condiment sage.
Abstr. in *Phytopathology*, 1947, 37: 363.
A disease of sage, *Salvia officinalis*, in California affects the root, crown and stem, causing plants to be stunted and wilted, with ash grey-green leaves. Badly diseased plants do not produce inflorescences and usually die. The disease is most conspicuous where plant beds are low, irrigation water stands, and drainage is poor. It is caused by *Phytophthora parasitica* and *Pythium aphanidermatum* either separately or in association.
2352. BAKER, K. F. 633.842
Transmission of *Rhizoctonia solani* in pepper and its prevention.
Abstr. in *Phytopathology*, 1947, 37: 359.
Pepper seedlings are subject to pre- and post-emergence damping-off caused by *Rhizoctonia solani*. Internal seed transmission was demonstrated, and the fungus is also carried in small bits of the fruit tissue. Treating the seed in water at 51-7° C. for 30 minutes eliminated the fungus without germination loss.
2353. SIMMONNEAU, P. 633.842-1.67
La culture irriguée de la flora en Oranie. (Growing red peppers under irrigation in the neighbourhood of Oran.)
Considérations sur la campagne de floraison 1946. (Red peppers in 1946.)
Fruits et Prim., 1946, 16: 72-5, and 1947, 17: 16-8, bibl. 1.
1½ kg. of red pepper seed, sown in a nursery bed, provided material to transplant a hectare at 20 to 25 cm. spacing, in April. The plots were irrigated fortnightly until the end of July, and the crop, harvested between August and November, averaged over 20 quintals. Although drying is not easy, the crop is profitable.
2354. SIEVERS, A. F. 633.85
The production of minor essential oils in the United States.
Econ. Bot., 1947, 1: 148-60, bibl. 17.
Tansy, wormseed, and wormwood, and recently dill and

lemongrass are cultivated. Essential oils have been distilled from wild plants including cedar leaf (*Thuja occidentalis*), cedarwood (*Juniperus virginiana*), erigeron, pennyroyal, saffraas, sweet birch, wintergreen, and witch-hazel.

2355. POLEZAEV, G. 633.85
Production on collective farms. II. A nursery for essential oil crops. [Russian.]
Kolhoznoe Proizvodstvo (Collective Farming), 1946, No. 1, p. 43.

A short description is given of the experimental work conducted in Pahtaabad, on the plantations of the Central Asiatic Zonal Station of the All-Union Research Institute of Essential Oils Industry, with patchouli, *Vetiveria* (?) spp., *Bigardia* spp., geranium, fennel, mint, lavender, the eugenol-containing *Basilicum* and others.

2356. SCULLY, N. J., AND DOMINGO, W. E. 633.853.55: 581.035
Effect of duration and intensity of light upon flowering in several varieties and hybrids of castor bean.
Bot. Gaz., 1947, 108: 556-70, bibl. 8.

Some varieties showed a marked response to variation of the photoperiod. 10% of the plants forming one F_2 progeny failed to flower under the experimental conditions, and also when grafted, as stock or scion, with other vegetative plants that were later induced to flower. Light intensity appears to be an important factor in certain varieties.—Beltsville, Md.

2357. GUÉDON, A., AND VIEL, G. 633.863.2(44)
La culture du carthame dans la région méridionale. (Safflower growing in the south [of France].)
C.R. Acad. Agric. Fr., 1943, 29: 544-7, bibl. 3 [received 1947].

Carthamus tinctorius L., the safflower, showed wartime possibilities as an oil seed for the uplands of Provence. At Grasse, in the dry season of 1943, the yield of oil was about 139 kg. per hectare.

2358. KOMLEV, P. P., AND SOKOLOV, S. J. 633.87
Euonymus verrucosa Scop. in the woodlands of the Tatar A.S.S.R., and its utilization. [Russian.]
Sovetsk. Bot., 1946, 14: 329-33.

It is explained how, by suitable methods of propagation and economic methods of exploiting the existing resources of *E. verrucosa*, the output of bark by the Tatar Republic could be greatly increased.

2359. STUEHR, E. T. 633.88(794/5)
The distribution, abundance and uses of wild drug plants in Oregon and Southern California.
Econ. Bot., 1947, 1: 57-68.

Based on surveys, now being extended to N. California and the State of Washington. Cascara (20, W), ginseng (25), goldenseal (25), belladonna (10), peppermint (4,500), flax (2,000), barberry (W), juniper (W) and ergot (W) thrive either wild (W) or in cultivation [figures in brackets are acreages cultivated in Oregon].

2360. MIRMANOFF, A. 633.88
De l'importance des plantes officinales en thérapeutique. (The importance of drug plants in therapeutics.)
Rev. hort. suisse, 1946, 19: 79-85.

The author tabulates drugs according to their therapeutic properties; the origin of each is noted. He points out that many drugs of vegetable origin have not yet been synthesized, and that certain synthetic drugs may be tolerated by bacteria. Interest in drug plants should be maintained, and new sources, such as the higher fungi, investigated.

2361. PERROT, —. 633.88(44)
Plantes médicinales de France. (Medicinal plants of France.)
Presses Universitaires, 4th Vol. 1944 (?) noted in *C.R. Acad. Agric. Fr.*, 1944, 30: 240.

This volume, which completes the series, contains plates 145

to 200, and, as a supplement, a third series of eight plates of exotic species.

2362. JAMES, G. M. 633.88-1.8
Effects of manuring on growth and alkaloid content of medicinal plants.
Econ. Bot., 1947, 1: 230-7, bibl. 22.

The application of nitrogen to plants that form alkaloids generally stimulates their growth and increases their alkaloid content; other minerals should be available in balanced proportions.

2363. WHALEY, W. G., AND BOWEN, J. S. 633.912
Russian dandelion (kok saghyz). An emergency source of natural rubber.
Misc. Publ. U.S. Dep. Agric. 618, 1947, pp. 212, bibl. 287.

This valuable, illustrated report summarizes the investigations carried out on kok saghyz in the U.S.A. between 1942 and 1944. It is primarily a record of field tests, but also serves as a general reference to past work and a guide to proposed future investigations. A notable feature of the report is its long bibliography.

The trials reported upon indicated that kok saghyz for rubber production can best be grown in Michigan, Wisconsin and Minnesota, while for seed production the best areas were the irrigated valleys of western Montana. On the basis of the indicated average, yields were about 45 lb. of rubber per acre. This compared favourably with reported Russian yields of 30 to 60 lb. per acre. The analyses of dried roots showed up to 7½% of rubber present, the average being about 4½%. Occasional samples gave over 7½%. The seed-yield on small irrigated areas in Montana was at the rate of 14 lb. per acre in the first year and 150 lb. per acre in the second season. Kok saghyz is slow and weak in growth and demands the care and cultivation normally given to market-garden crops. A root-harvesting machine was constructed and worked satisfactorily on sandy soil. A satisfactory 4-row mechanical seed-picker was also developed. A comparatively simple method was evolved for the recovery of rubber, the roots being softened in hot water and then macerated in a pebble-mill, the slurry from which was passed over a vibrating screen to separate the rubber. Factory and road tests showed that kok saghyz rubber is as satisfactory as *Hevea* rubber in the carcasses of heavy-duty tyres, for which synthetic rubber is unsuitable. Kok saghyz rubber is much superior to guayule rubber. The future of kok saghyz as a crop depends very largely on the improvement of its vigour, size and rubber content by plant breeding and selection; but also on increased knowledge of the mode of formation of its latex and rubber and their functions in the life of the plant.

2364. CHEVALIER, A. 633.913.633.912
Peut-on cultiver des plantes à caoutchouc en France ? (Can rubber plants be grown in France ?)
C.R. Acad. Agric. Fr., 1943, 29: 120-3 [received 1947].

After reviewing the Russian efforts, the author concludes that France should rely on her colonies for rubber.

2365. KOLESNIK, I. 633.913
Production on collective farms. III. Cultivating *T. kok saghyz* in clumps. [Russian.]
Kolhoznoe Proizvodstvo (Collective farming), 1946, No. 2-3, pp. 25-7.

A comparison is made between two methods of planting crops of *T. kok saghyz*: (1) in rows and (2) in clumps. It is claimed that (1) is inefficient, in that it requires nearly five times as many man-days per one center of roots as (2); at the same time, 40 to 50% of the roots remain undug on (1) plantations. During 1945, in the Kiev Province where the clump method of planting was practised, the average yield from the year-old plantations was 30.9 centners per ha., i.e. 75 kg. of caoutchouc per ha. or more than double

that obtained by the row method of planting from a 2-year-old plantation in the Sumy Province. On some farms the yield of roots was as high as 100 to 120 centners per ha. and that of seeds 35.5 to 65.3 kg. per ha. Hence the clump method is recommended.

2366. MULLER, C. H. 633.913: 581.144.2
Root development and ecological relations of guayule.*
Tech. Bull. U.S. Dep. Agric., 923, 1946, pp. 114, bibl. 18, 25 cents.

A study of guayule (*Parthenium argentatum*) growing under wild and cultivated conditions. The illustrations of root-systems are profuse.

2367. TRAUB, H. P. 633.913: 581.192
Concerning the function of rubber hydrocarbon (caoutchouc) in the guayule plant, *Parthenium argentatum* A. Gray.
Plant Physiol., 1946, 21: 425-44, bibl. 26.

By studying the response of the plant to repeated defoliation the author concludes that (a) rubber is not a food reserve, (b) the resins fraction may contain a rubber precursor, and (c) other substances, such as pectins, may be important reserves.—Salinas, Calif.

2368. BENEDICT, H. M., MCRARY, W. L., AND SLATTERY, M. C. 633.913: 581.032
Response of guayule to alternating periods of low and high moisture stresses.
Bot. Gaz., 1947, 108: 535-49, bibl. 16.

The accumulation of rubber in guayule may be forced by alternating periods of low and high moisture stress; these periods should not be too short, and should not occur during winter, when there is little increase in the rubber content of the plants. Levulins appear to be the principal reserves.—Salinas, Calif.

2369. CAMPBELL, W. A. 633.913:2.4
A bacterial root and stem disease of guayule.
Phytopathology, 1947, 37: 271-7.

A root and stem disease of guayule in the San Joaquin Valley of California in 1944 and 1945 was caused by an *Erwinia* sp. Losses were generally associated with heavy summer irrigations. Infections developed at or below the root crown, presumably through injuries. Symptom expression was influenced by temperature and type of growth. Succulent plants wilted suddenly, but hardened plants frequently wilted branch by branch or the leaves dried on the plant without pronounced wilting.

2370. STARR, M. P. 633.913:2.3
The causal agent of bacterial root and stem disease of guayule.
Phytopathology, 1947, 37: 291-9, bibl. 20.

The bacterium which causes a root and stem disease of guayule is described and its systematic position is discussed. The name *Erwinia carotovora* f.sp. *parthenii* f.sp.nov. is suggested for the organism.

2371. GRIGSBY, B. H. 635.13:2.954
Oil sprays for the control of weeds in carrots and related crops.
Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 201-7, bibl. 2.

Oil sprays were tested for weed control in parsnips, celery and carrots. In all three cases good results were obtained. Materials, methods and results are here discussed.

2372. MACDONALD, J. A. 635.13:2.77
Experiments with D.D.T.
Scot. Agric., 1947, 27: 7-9, bibl. 4.

One season's trials show that spraying with DDT is superior

to dusting for the control of the carrot fly, the percentage of unsaleable roots in untreated, dusted and sprayed plots being 5.1, 3.0 and 2.1 respectively. The experimental crops received only one application on 22 July, but it is suggested that seed treatment with DDT dust and a second spray application, 6 weeks after the first, to control the second generation, would improve the results. Club root of cabbage and late blight of potato were not affected by the insecticide.—St. Andrew's University.

2373. REIMERS, F. E. 635.25: 581.144.2
Pause and inversion in processes of bulb-formation in *Allium cepa* L.
C.R. Acad. Sci. U.R.S.S., 1947, 55: 65-7.

The experiments described led to the following conclusions: (1) The processes leading to the formation of the onion bulb are reversible, i.e. it is possible to restore, under the influence of daylength, the kind of exchange which is typical of the developmental phase preceding bulb formation. (2) The stimuli determining reversion to the preceding type of exchange are formed in the green leaves. (3) The parameter of the lability of the process of bulb formation is very wide. Reversion to the kind of exchange typical of a younger age of the plants is possible where physiological processes are morphologically fixed in the form of a ready bulb which has entered dormancy.

2374. NELSON, R. 635.25: 632.4
Dust fungicides versus formaldehyde in the control of onion smut.
Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 226-47, bibl. 6.

In Michigan, onion smut is so widespread that considerable attention is paid to control where a seeded onion crop is grown. It consists of the laborious and therefore expensive method of applying a dilute formaldehyde solution in the row with the seed. Since seed treatment tests with Arasan and Thiosan dusts, carried out for several seasons, have so far not given equally good control, growers are advised to continue the standard practice, but to start trial plantings in heavily infested plots using $\frac{1}{2}$ lb. of dust mixed in the drill at the time of seeding with 1 lb. of seed.

2375. LEE, O. C., AND ELLIS, N. K. 635.25: 632.954
Weeding onions with diluted sulfuric acid and other chemical materials.
Circ. Purdue agric. Exp. Stat. 325, 1947, pp. 10.

The authors recommend a pre-emergence spray of 3-5% v/v 60° Beaumé technical sulphuric acid, followed, if need be, by sprays of 2-3% at the two-leaf stage, or when the onion leaves are 10 inches long; the higher concentrations should only be used when the temperature is below 70° F. and the humidity low. 75-125 U.S. gallons cover an acre.

2376. STUART, G. M. 635.263
The shallot.
Scot. Agric., 1947, 27: 92-5, bibl. 4.

The culture of the shallot in Scotland and precautions against the spread of the yellow dwarf virus are discussed. In a two-years' test, carried out at the East of Scotland College of Agriculture with the object of determining the optimum size and distance at which to plant shallot cloves, it was found that "yield is influenced by the size of the cloves. Small cloves produce a low yield of large shallots, while big cloves give a good crop of small bulbs."

2377. DONCASTER, J. P. 635.263: 632.753
The shallot aphid *Myzus ascalonicus* sp.n. (Hemiptera, aphididae).
Proc. roy. ent. Soc. Lond. (B), 1946, 15: 27-31.

Detailed descriptions are given of the apterous and of the alate viviparous females of *Myzus ascalonicus*, a new species of aphid. This aphid occurs commonly on the stored bulbs of shallots and onions during winter, and on one occasion stored tulip bulbs were found to be heavily attacked. It

* Being report on Special Guayule Research Project, Bur. Pl. Ind., Soils and Agric. Engrng.

will infest onions and allied plants in all stages of growth, and may also colonize various other hosts, including lettuce and seedling brassicae under glass, and many common weeds. Laboratory tests have shown that it is an efficient vector of several plant viruses.

2378. TIMS, E. C. 635.263: 632.4

White rot of shallot and its control.

Abstr. in *Phytopathology*, 1947, 37: 437.

The amount and severity of infection of shallots by white rot (*Sclerotium cepivorum*) was reduced by applying lime to the infested soil so as to change the pH from 5.6-5.8 to about 7, but satisfactory control was not obtained. Semesans at the rate of 1 oz. per gallon of water and mercuric chloride (1-500) applied at the rate of 80 c.c. per plant gave almost complete control.

2379. SIMONNEAU, P. 635.262

L'ail d'orient. (Oriental garlic.)

Ann. Inst. agric. Algérie, 1946, 3: 3-20.

A description of *Allium ampeloprasum* with details of some trials conducted with it in Algeria and notes on the conclusions drawn.

2380. ASTREGO, J. J. 635.31(492)

De limburgse aspergeteelt. (Asparagus culture in Limburg.)

Tuinbouw, 1947, 2: 172-6.

An account of asparagus culture in North and Mid-Limburg. The implements used are shown in eight photographs. The varieties of asparagus grown in the region are Roem van Brunswijk and Vroege van Argenteuil. These are often grown side by side and hybridization has given rise to a number of selections some of which are under trial. The chief pest of the crop is the asparagus fly which is difficult to control, and orders have recently been issued with the object of restricting its dispersion.

2381. ANSTAY, T. H., AND WOODS, J. J. 635.31

Length of cutting season of asparagus.

Sci. Agric., 1947, 27: 263-6, bibl. 4.

Over 10 years an 8-week cutting period has produced a greater total crop, and the rate of decline has been less, than where a 12-week cutting period was observed. The average stalk size was smaller for the 12-week plots, but season influences stalk size more than cutting.—Agassiz, B.C.

2382. POUND, G. S. 635.34: 632.4

Diseases of cabbage plants grown for seed in western Washington.

Bull. Wash. agric. Exp. Stat. 475, 1946, pp. 27, bibl. 14.

This is a report on a disease survey of cabbage seed crops, made for the period 1943-46 in the Puget Sound area and in Skagit County, Washington, which, especially the latter, were practically the only cabbage seed growing regions in the U.S. before 1942. The intensive culture of crucifer seed crops favoured the build-up of diseases, among which mosaic was the most destructive. However, in 1945 it was found that the practice of locating plant beds in areas isolated from diseased seed fields reduced the percentage of infected plants from 60-75 to almost nil. Ring spot (*Mycosphaerella brassicicola*), another serious disease, was shown to be controlled by proper crop management, while crop rotation is recommended as a measure against *Sclerotinia* stalk rot (*S. sclerotiorum*). Downy mildew and some minor diseases are also discussed.

2383. FOSTER, H. H. 635.34: 632.4

Reaction of species and varieties of *Cruciferae* to artificial inoculation of cabbage downy mildew.

Abstr. in *Phytopathology*, 1947, 37: 433.

All the cabbage, broccoli, brussels sprouts, cauliflower, collard and kohlrabi varieties tested were susceptible; turnips varied from resistant to tolerant; mustard, radish and Chinese cabbage varieties were highly resistant. No variety tested was immune.

2384. SAVARY, A. 635.34: 632.76

Les ceuthorhynques des choux. (*Ceutorrhynchus* spp. on cabbages.)

Rev. hort. suisse, 1947, 20: 84-9.

An account is given of the life cycle of the *Ceutorrhynchus* beetles which attack cabbages in Switzerland. Field tests allow these recommendations to be made: the underside of the leaves should be sprayed with 100 to 150 g. benzene hexachloride in 10 l. water when the adults appear—this is to be announced by radio—and once or twice more at intervals of 8 days. For winter cabbages the first treatment would be given at the end of March or early in April. The top of each plant should be dipped in the same liquid before transplanting.—Lausanne.

2385. HASEMAN, L. 635.34: 632.78

Prevent cabbage worm injury.

Circ. Mo. agric. Exp. Stat. 259, 1943 [received 1947].

Four species of cabbage worm are important in Missouri gardens; two are caterpillars of white butterflies, the other two of night-flying moths. For such crops as cabbage, brussels sprouts, kohlrabi, and turnips the simplest treatment is to make a light dusting, using 1 part lead arsenate and 5 parts of lime or flour. It is perfectly safe to use such a poison on cabbage, but only until heads begin to form, and on cole crops before they approach maturity, but it should not be used on lettuce or similar vegetables.

2386. FOSTER, H. H. 635.35: 632.4

Comparison of benzene vapor with certain sprays in the control of downy mildew of cauliflower.

Phytopathology, 1947, 37: 428-31.

In these experiments Spergon (wettable) gave the best control of downy mildew (*Peronospora parasitica*) on cauliflowers. Dow Seed Protectant No. 5 (tetrachloro-para benzoquinone) gave next best control, while the benzene treatment was very unsatisfactory and caused severe injury. Cabbage plants, grown in an adjoining seedbed and treated with the same rate of benzene, remained vigorous and relatively free from mildew.

2387. CHORIN, M. 635.35: 632.411.4

Downy mildew on cauliflower curds.

Reprint *Palestine J. Bot. (R)*, 1946, 5: 258-9.

Downy mildew (*Peronospora brassicae* Gaum.) develops on leaves and on the upper, but not on the lower, surface of the top parts of the flower stalks where it produces a greyish down. The disease is especially noticeable on plants left in the field after the normal ripening of the head for seed. No control trials have been made in Palestine, but copper fungicides are recommended in other countries.

2388. MIDDLETON, J. T. 635.48: 632.41

Pythium crown rot of rhubarb.

Reprint *Bull. Torrey bot. Club*, 1947, 74: 1-8, bibl. 22.

Rhubarb plants infected with *Pythium* crown rot usually wilt, the leaves turn yellow and later collapse. Infected crowns are brown, soft and water-soaked. The petioles and bud scales may also be affected. Several species of *Pythium* are involved, *P. ultimum* being the most virulent. No mention is made of control measures.

2389. MEUNISSIER, A. 635.52

Les laitues. (Lettuces.)

Fruits et Prim., 1946, 16: 33-42, bibl. 6.

A review of the literature and history of lettuce throughout the world.

2390. MORSE, R. 635.52

A perpetual lettuce.

Countryman, 1947, 36: 60.

A note in praise of the U.S.A. variety, Grand Rapids, which is unlikely to be seen in shops, because it makes no heart. It is one of the most valuable garden varieties since it

provides a succession of large, crimped leaves, the lowest of which are cut for table as they mature. This variety shows little tendency to bolt, tolerates hot weather well but is not winter hardy.

2391. BOWSER, P. H. 632.951: 635.52
Effects of DDT on cabbage maggot of radish and on aster yellows and the leaf hopper of head lettuce: A progress report.
Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 194-7.

Cabbage maggot (*Hylemyia brassicae*) on radishes was effectively controlled by 3 applications of a 5%-DDT dust, beginning with the emergence of the seedlings and then at weekly intervals. DDT dust of the same concentration gave, moreover, reasonably good control of leaf hopper (*Macrostelus divinus*) of head lettuces throughout the season. Early dusting, immediately after thinning, seems important. It appears to be an advantage to dust all grass areas and fence rows surrounding the lettuce field in order to prepare a trap area for migrating hoppers.

2392. KERSHAW, C. J. 635.53
Celery trials, 1945-46.
Tasm. J. Agric., 1946, 17: 319-26.

The results of the trials described showed that the Long Export White type was most resistant to disease, and was a more uniform type than the other varieties tested. Regular sprayings and dustings were necessary to control blight (leaf spot) and aphid attacks. In the average season it would seem that irrigation by overhead watering or by flooding would be necessary to achieve maximum quality and yield.

2393. WESTON, W. A. R. D. 635.53: 632.4
Clean seed—clean celery.
Agriculture, 1947, 54: 322-5, bibl. 1.

While the weather may be extremely important in determining the severity of an attack of celery leaf spot (or blight), the fungus itself, *Septoria apii graveolentis*, is carried in the seeds and is passed on to the seedlings. No entirely successful method of killing the fungus has been found, nor has heat or chemical treatment of seed proved entirely satisfactory. The remedy lies in thorough and regular spraying of the seed crop with bordeaux mixture. Directions for doing this are given. Rigorous hygiene should be observed in dealing with seed boxes and frames.

2394. MARCEL, —. 635.54
Utilisation de la chaleur des carrières souterraines pour la production de la chicorée Witloof. (The production of Witloof chicory in cellars.)
C.R. Acad. Agric. Fr., 1943, 29: 290-2 [received 1947].

Old mushroom beds may be used for forcing chicory: cellar temperatures remain fairly constant, so that artificial heat is unnecessary.

2395. WALKER, W. F. 635.61/62
Cucurbit investigations.
Tasm. J. Agric., 1946, 17: 335-41.

Notes are given on the results of variety trials of 5 varieties of pumpkin and 7 varieties of marrow.

2396. HUTCHINS, A. E. 635.62
A new family-size squash: the Rainbow.
Minn. Hort., 1947, 75: 5-6.

The squash variety Rainbow, which has just been released after satisfactory tests all over Minnesota, originated from a cross between inbred lines of the Greengold and Banana varieties. A technical description of the new variety is given.

2397. LUTOHIN, S. N. 635.62: 631.531
The effect of seed size on the yield of water-melons, melons and squashes. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1947, No. 3, pp. 19-21, bibl. 12.

Data obtained show the great positive effect that the largest seeds have on the yield of cucurbits compared with that of unselected seed.

2398. MIDDLETON, J. T., AND YARWOOD, C. E. 635.611: 632.421.1
Fungicidal control of cantaloupe powdery mildew.

Bull. Calif. agric. Exp. Stat. 697, 1946, 8 pp.
Powdery mildew, *Erysiphe cichoracearum*, is the most serious disease of cantaloupes in California. For its control a first spray should be applied when 1 to 5 mildew spots per leaf are found on the lower surfaces of the crown leaves. For early-planted cantaloupes a second application should follow when mildew again increases to this same degree of severity, but usually only one application is necessary for medium and late cantaloupes. When temperatures are below 95° F., 38 oz. of liquid lime-sulphur (0.3 gal.) plus 6 oz. of B-1956 per 100 gal. water is the most economical and one of the most effective sprays used. At temperatures above 95° this spray is injurious and 1.5-2-100 burgundy or 1.5-100 Cuprocid plus spreader may be recommended.

2399. DUVDEVANI, S., REICHERT, I., AND PALT, J. 635.63: 632.421.1: 632.411
The development of downy and powdery mildew of cucumbers as related to dew and other environmental factors.
Reprint Palestine J. Bot. (R), 1946, 5: 127-51, bibl. 13.

Observations were made on the development of downy mildew (*Pseudoperonospora cubensis*) and powdery mildew (*Erysiphe cichoracearum*) on cucumber plots, some left exposed to the air, others covered with canvas to prevent the formation of dew. Lack of dew largely inhibited the development of downy mildew while it was very severe on the plots exposed to dew. This difference was most pronounced on plots irrigated by furrows but was also well-marked on plots under overhead irrigation. Exclusion of dew failed to affect the development of powdery mildew.

2400. REICHERT, I., PALT, J., AND MOELLER, S. 635.63: 632.411: 632.421.1
Field trials for the control of downy and powdery mildew of cucumbers.
Reprint Palestine J. Bot. (R), 1946, 5: 214-29, bibl. 14.

On furrow irrigated plots of cucumber dusting with sulphur gave excellent control of downy mildew (*Pseudoperonospora cubensis*), while 1.5% lime-sulphur spray was partly effective. Sulphur dust also controlled powdery mildew (*Erysiphe cichoracearum*), considerably reduced aphid populations, and did not seriously affect the foliage. The yield increase resulting from sulphur dusting reached as much as 60-70% in some trials. Spraying with weak copper sprays also showed satisfactory fungicidal action against the downy mildew, but failed to increase yields so much as sulphur dusting. In trials with overhead irrigation neither copper nor sulphur treatments succeeded in adequately protecting the crop when downy mildew was severe. As overhead irrigation favours downy mildew, only furrow irrigation should be used where the disease is serious.

2401. EPPS, J. M. 635.615: 632.4
A new wilt-resistant watermelon.
Abstr. in Phytopathology, 1947, 37: 433.

A new variety of melon, named Miles, originating from a cross between Dixie Queen and Klondike is highly resistant to *Fusarium* wilt. It is of high quality, has small white seed, is green with darker green stripes, is oblong and has a

tough rind. It is prolific and usually sets many fruits, which average about 25 lb. with some weighing 40 lb. It is satisfactory in size, shape, quality, colour and resistance to disease.

2402. RAINIO, A. J. 635.63: 632.8
The crinkly mosaic disease of cucumbers, and how to combat it.
Valt. Maatalousk. Tiedon. 1941, No. 178,* 8 pp. [received 1947].

In Finland, the disease first appeared in 1932 in glasshouses near Tampere. The symptoms in young leaves are small, greenish-yellow, slightly transparent patches. As the disease advances, being encouraged by a warm damp atmosphere and generous manuring, the leaves and veins become distorted, the spaces between the veins rising in blisters; gall-like lumps and a greyish colour may also develop. Flowering is abundant, but no fruit is formed. Though no variety of cucumber resistant to *Cucumis virus I*, the cause of the disease, is known, the following precautions should be taken to prevent either the occurrence or the spread of the disease: Prevention of possible vectors such as *Oniscus ascellus*, by nicotine and arsenical washes and baits. Knives used for cutting down the fruit must be disinfected with formalin or alcohol. The hands must be washed in soft soap and water. All plants showing signs of infection must be burnt.

2403. POLJANKOVA, T. 635.64: 581.165.71: 576.356
Changes in the chromosome number and morphology in tomatoes under the influence of grafting. [Russian.]
Agrobiologija (Agrobiology), 1946, No. 2, pp. 128-30.

Seeds of the second generation from grafts of the tomato *Ponderosa* on *Solanum dulcamara* and of Sparks on *Epicure* potato were sown, and the seedlings subjected to cytological analysis, which is here discussed.

2404. STRONG, M. C. 635.64: 577.17
Use of 2,4-dichlorophenoxyacetic acid for the improvement of greenhouse tomato production.
Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 216-25, bibl. 6.

A 10 p.p.m. 2,4-D spray applied to glasshouse tomatoes in spring did not increase the number of fruits set above that of pollinated plants, but it increased average fruit weight from 4.9 oz. for pollinated fruits to 6.2 oz. and decreased the period from blossoming to fruit ripening by 1-2 weeks. In the autumn crop, when a low fruit set from pollination is usual, the treatment doubled the set and increased fruit size by approximately 20%. More than one application per truss proved harmful to the plant. Some of the parthenocarpic tomatoes were entirely hollow. The growth substance was also applied in the form of a vapour produced by vaporizing methyl dichlorophenoxyacetate on an electric hot plate, with an electric fan operating nearby. The higher concentration tested (1 mg. per 500 cubic feet), though inducing a high fruit set, was found to cause severe deformation of the leaves and 4 weeks' delay in flower bud development, while a concentration of 1 mg. per 800 cubic feet failed to induce parthenocarpic fruit development to an appreciable extent. A happy medium may still be determined.

2405. LEE, F. A., AND SAYRE, C. B. 635.64: 581.192
Factors affecting the acid and total solids content of tomatoes.
Tech. Bull. N. York St. agric. Exp. Stat. 278, 1946, pp. 28, bibl. 11.

The acid content of the tomato varieties grown for canning in New York ranged from 0.4 to 0.5% of the fresh weight of the ripe fruit. With average rainfall, the total solids content ranged from about 6.5 to 7.0%. All varieties were more acid and had higher total solids content when

soil moisture was limited and were less acid and more watery when it was abundant during the period of ripening. In general, the acid content is highest at the beginning of the harvesting period, and it then drops at successive pickings until the final harvest when a slight rise in acid content may occur. The amount and kind of fertilizer used significantly affected the acid content and total solids of ripe tomatoes. Liberally fertilized tomatoes had a significantly higher total solids content than unfertilized tomatoes. Nitrogen fertilizers when applied with phosphorus and potash increased the total yield but had no appreciable effect on the acid content. Potash fertilizers definitely increased the acid content and total solids. Boron, manganese, and magnesium when applied as soil amendments, had no significant effect on the acid content or on the total solids content. Fertilizer placements which gave the best yields also produced the highest total solids content. [From authors' summary.]

2406. NICHOLAS, D. J. D., AND STANTON, W. R. 635.64: 632.19: 546.46
Experiments on the control of magnesium deficiency in glasshouse tomatoes. IV. Concluding report.*
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 66-79, bibl. 4.

The conclusions drawn in this, the last part of the report on this series of experiments, are as follows. A minimum of 10 cwt. per acre of magnesium sulphate (30% MgO) is necessary to alleviate the deficiency and a better control was obtained using 20 cwt. Foliage sprays were more effective than soil applications, although less material was used. The most effective control was obtained by using a 2% spray five times at intervals of two or three weeks during the growing season, beginning at the early growth stage. Early sprays were useful in delaying the onset of symptoms and late sprays arrested their development. The 1% rate proved less effective than a 2% foliage spray during the current season. The inclusion of a 2% magnesium sulphate in the fungicide spray, e.g. Shirlan A.G. (4 fluid oz. per 4 gall.) proved as effective as the magnesium salt used alone in the correction of the deficiency. Risk of spray injury is decreased by spraying on sunny days when quick drying takes place. Trial sprays are recommended before each main application. Chemical data on the mid-stem leaves suggest that 0.50% MgO may be used as a rough dividing line between a sufficiency and a deficiency of the element.

2407. YOUNG, P. A. 635.64: 632.3/4
Tomato diseases in Texas.
Circ. Tex. agric. exp. Stat. 113, 1946, 66 pp., bibl. 91.

The symptoms, causes, and control of 61 diseases and abnormalities of tomatoes in Texas are described. Bacterial spot (nailhead rust) is the most destructive tomato disease in East Texas. Early, late, and *Septoria* blights cause damage and can be controlled by sprays and dusts. Virus diseases of tomatoes include mosaic, fern leaf, curly top, and tip blight. Southern blight (*Sclerotium rolfsii*) is the most destructive of the diseases caused by soil-inhabiting parasites; its symptoms are illustrated and its economic hosts listed. Unfavourable growing conditions cause cracks, sun injuries, blossom-end rot, etc. General methods for controlling the diseases include sanitation, crop rotation, use of resistant varieties and the application of sprays or dusts.

2408. SELMAN, I. W. 635.64: 632.8
Resistance to mosaic infection in the tomato in relation to soil conditions.
J. Pomol., 1947, 23: 71-9, bibl. 9.

Watering and fertilizer trials on tomato plants under glass

* See also *Valt. Maatalousk. Julk.* 109, noted H.A., 13: (947).

in relation to resistance to yellow mosaic virus are described. Overwatering was found to decrease the resistance of plants to systemic invasion with this virus. Healthy plants, similarly watered, showed more yellowing of the lower leaves and a greater proportion of blotchy fruits than did plants receiving less water. No simple relation could be shown between resistance to infection and any single constituent of soil or leaf. It is concluded that soil conditions are related to resistance of the plant to mosaic infection. Of the many interrelated factors involved, there is evidence that under nursery conditions on a fertile soil, the supply of soil water and of concentrated fertilizers may be of some importance in this connexion.—Experiment and Research Station, Cheshunt, Herts.

2409. HODGSON, R., RIKER, A. J., AND PETERSON, W. H. 635.64: 632.3

A wilt-inducing toxic substance from crown-gall bacteria.

Phytopathology, 1947, 37: 301-18, bibl. 40.

Filtrates from crown-gall bacteria induced wilting followed by a necrosis in leaflets of tomato cuttings. Results obtained suggest that the toxic substance is a glucosan.

2410. HENDERSON, R. G. 635.64: 632.48

Tomato blight control in southwest Virginia.

Bull. Va agric. Exp. Stat. 394, 1946, 9 pp.

Early blight (*Alternaria solani*), septoria leaf spot (*Septoria lycopersici*), and late blight (*Phytophthora infestans*) are extremely destructive on tomatoes nearly every year in south-west Virginia. Spraying and dusting the foliage and fruits with fixed or insoluble copper fungicides such as cuprous oxide and tribasic copper sulphate, will keep these diseases under control. The dust mixture should contain about 3% metallic copper and the diluent should be pyrophyllite or talc. Yellow cuprous and tribasic copper sulphate should be used at the rate of 1½ lb. and 3 lb. respectively per 100 gal. water. The first application should be made 10 to 14 days after transplanting, other applications at 7 to 10 days intervals. Five to seven applications will usually be required for satisfactory results.

2411. THOMAS, H. R. 635.64: 632.4: 631.8

Influence of different levels and combinations of nitrogen, phosphorus, and potassium on the susceptibility of the tomato plant to infection by *Alternaria solani*.

Abstr. in *Phytopathology*, 1947, 37: 441-2.

Varying the level and combinations of nitrogen, phosphorus, and potassium in sand culture greenhouse tests affected the response of tomato plants to infection by *Alternaria solani*. Plants grown in solutions medium to high in nitrogen, low in phosphorus, and medium to high in potassium were usually the most susceptible to disease.

2412. ROBERTSON, D. 635.64: 632.651.3

Control of tomato root eelworms.

Scot. Agric., 1947, 26: 160-2, bibl. 1.

In a small-scale trial with glasshouse tomatoes the application of 3-6 c.c. D-D per injection into 8-in. holes, 12 in. apart (=400 lb./a.), was found to give effective control of *Heterodera marioni* and *H. rostochiensis* in infected soil.—North of Scotland College of Agriculture.

2413. ANON. 635.65(65): 664.84.047

Production des légumes secs en Algérie. Culture-Conservation. (Production of dried legumes in Algeria. Culture and preservation.)

Doc. Rens. agric. Algér. Bull. 117*, 1945, pp. 19.

The recommendations made concern various members of the bean family, lentils, peas and chick peas.

* See also H.A., 15: 1078.

2414. SAUNDERS, A. R., AND LAUBSCHER, F. X. 635.65

Field experiments at Potchefstroom. A summary of investigations conducted during the period 1940-1945.

Sci. Bull. S. Afr. Dep. Agric. 246, 1945, pp. 57, 6d. [received 1947].

Beans: The Large White kidney bean (*Phaseolus multiflorus*) has two important advantages over the other common bean varieties in that it has hypogeal germination so that its seedlings are less liable to break their necks in crusty soils and, secondly, it has long flowering racemes with an extended flowering period which enables it to set seed in spite of drought periods during flowering. Attempts were made, with some success, to combine these desirable characters with those of *P. vulgaris*. Breeding for disease-resistance was also undertaken.

2415. LEBEAU, F. J. 635.65: 632.8

A virus-induced top necrosis in bean.

Abstr. in *Phytopathology*, 1947, 37: 434.

Mechanical inoculation with a virus isolated from bean pods caused in bean seedlings a fine systemic chlorotic stippling which rapidly became necrotic, and was followed by early abscission of leaves and blossoms. The plants of certain varieties of beans were killed outright. A number of other leguminous plants proved also to be susceptible.

2416. DANA, B. F. 635.65: 632.8

Phyllody of common beans, a graft transmissible disease.

Abstr. in *Phytopathology*, 1947, 37: 360-1.

Experiments and observations suggest that phyllody symptoms on common bean, lima bean and soybean, tomato, alfalfa and squash as well as a number of ornamental plants, may be due to infection by one or more strains of the aster-yellow virus.

2417. BJORNSETH, E. H. 635.65: 632.95

One year's results from dusting snap beans to control anthracnose and leaf hoppers.

Quart. Bull. Mich. agric. Exp. Stat., 1946, 28: 191-3.

The advent of DDT, which controls leaf hopper of snap beans, at last made it possible to estimate the damage done by this pest. In an area, where snap beans were the main crop, 4 applications of 3% DDT dust were found to increase yields by 66-65 bushels per acre, or 42-5%. The trial was designed to give, in addition, information on the fungicidal value of Fermate against anthracnose, but 1945 was not favourable for the development of the disease.

2418. OGILVIE, L., AND MUNRO, M. 635.65: 632.452

Chocolate spot of field beans in the south west.

A.R. Long Ashton Res. Stat. 1946, 1947, pp. 95-100, bibl. 14.

The occurrence of *Botrytis fabae* Sardinia as a cause of chocolate spot of field and broad beans in Britain is described. Control measures recommended are: (1) Choose, where at all possible, fields which are on a slope or well exposed to the prevailing wind. Where this is impossible, alleyways might be left running through the fields in the direction of the prevailing wind to promote rapid drying after rain. (2) See that the plants are well supplied with potash and phosphates. As a long term policy, the selection of plants apparently somewhat resistant to chocolate spot would probably be worth while.

2419. REICHERT, I., AND PALT, J.

635.651: 632.482: 632.452

Rust and chocolate spot of broad beans in Palestine.

Reprint *Palestine J. Bot. (R)*, 1946, 5: 202-13, bibl. 13.

In Palestine the appearance of chocolate spot (*Botrytis fabae*) on broad beans is not markedly affected by the mean

daily temperature, while rust (*Uromyces fabae*) is dependent on the temperature, failing to appear in months with daily means of 10° C. or less. Both diseases can be adequately controlled by spraying with $\frac{1}{2}\%$ Perenox at intervals of 10 to 14 days. Spraying increased the yield of green pods significantly where the attack of rust was early and severe.

2420. BARRY, J.-P. 635.65-2.481
Un grave maladie de la fève (*Botrytis fabae* Sardinia). (A serious bean disease.)

Prog. agric. vitic., 1947, 127: 290-1, bibl. 3.
A serious outbreak of chocolate spot in beans is reported from Herault. Recommendations are, to burn affected haulms on the spot and to rotate crops.

2421. OGILVIE, L., AND MUNRO, M. 635.65: 632.4
Occurrence of *Botrytis fabae* Sardinia in England.

Nature, 1947, 160: 96, bibl. 2.
Botrytis fabae was shown to be the chief cause of chocolate spot of beans in south-west England, in contrast to the eastern counties, where *B. cinerea* was identified earlier as the principal pathogen responsible for the bean disease of the same name.

2422. HASEMAN, L. 635.651: 632.76
Controlling bean leaf damage by beetles.
Circ. Mo. agric. Exp. Stat. 263, 1943, pp. 2 [received 1947].

The bean leaf weevil and the Mexican bean beetle and their habits are briefly described. To control these pests one of the following poison sprays or dusts should be applied every week, beginning as soon as the beetles appear: (1) Magnesium arsenate 1 tablespoonful, water 1 gal. (2) Magnesium arsenate 1 lb., hydrated lime 4 lb. (3) Calcium arsenate 1 lb., hydrated lime 9 lb., or (4) Cryolite, applied as spray or dust. The lower surface of the foliage, where the beetles feed mostly, should be covered. Do not use lead arsenate on beans as it tends to dwarf the crop.

2423. MILES, M. 635.65: 632.77
The bean seed fly, *Chortophila cilicrura* Rond.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 89-95.

The only host plants hitherto recorded of the bean seed fly in Britain are beans and peas, but the maggots have now been found on spring cabbage, cauliflower, kale, brussels sprouts, leek and onion. The nature of the injury on these hosts is described and notes on the biology and habits of the pest are given. Some of the measures of control tried abroad are summarized, viz. seed dressing, soil dressings, baiting and trapping. In an experiment in Worcestershire with flake naphthalene, applied at $\frac{1}{2}$ cwt. per acre immediately after the preparation of the seedbed and again immediately subsequent to harrowing the ground after planting, there were 61% healthy on the treated plot and 53% on the untreated plot.

2424. ARMAND, J. E. 635.65: 632.754
Applying DDT on white bean plants.

Canad. Food Ind., 1947, 18: 9: 25-7, bibl. 1.
DDT, applied as dust or emulsion spray, gave enough control of the potato leaf hopper, *Empoasca fabae*, on Micholite white beans to improve their growth and yield. No injury to the plants was apparent.

2425. LEROUX, D. 635.656: 631.811.9
Influence de quelques "oligo-éléments" sur le développement d'une légumineuse. (The effect of certain trace elements on the development of a legume.)
C.R. Acad. Agric. Fr., 1940, 26: 481-7 [received 1947].

An experiment is described in which peas were grown in pots. The soil used had received liberal amounts of farmyard manure but no artificial fertilizers and the elements to be studied were added, viz. boron, fluorine, arsenic, iodine

and chromium as borate, fluoride, arsenite, iodide and chromate of sodium, and manganese, copper, zinc and lead as sulphates. The amounts used were 2 and 3 mg. of the trace elements per kg. of dry soil. When the seeds were mature the plants were harvested and the weights determined of: A. stems and leaves, B. empty pods, A+B, C. seeds, and total crop. There was increase over controls in every case except with lead, which depressed the yield below that of the controls.

2426. LEROUX, D. 635.656: 631.811
Oligo-éléments et teneur en azote des graines de pois. (Trace elements and the nitrogen content of peas.)
C.R. Acad. Agric. Fr., 1941, 27: 807-10 [received 1947].

The data obtained show that at 2 and 5 mg. per kg. of soil trace-elements generally raise the nitrogen content of the peas harvested; in two cases there was no change, in two others there was a decrease. The increase, though never large, was appreciable, ranging generally from 4 to 7%, but rising to 14% with arsenic.

2427. DITMAN, L. P., SMITH, F. F., AND BURKHARDT, G. 635.656: 632.753

Liquefied gas aerosols for pea aphid control: Third report.*

J. econ. Ent., 1947, 40: 190-4, bibl. 2, being *Contr. Md agric. Exp. Stat.* 2033.

Results of the 1946 season's work indicate that Freon-propelled-DDT aerosols were slightly inferior to DDT-emulsion sprays and to methyl chloride propelled aerosols. All methods were highly effective against the pea aphid. Aerosol dispensers proved to be efficient, dependable, and rapid in effecting commercial treatments. The light equipment can be used on fields when ground is too wet for a heavy sprayer and under conditions of relatively high wind velocities which would prevent efficient application of dusts. The preparation of aerosol solutions is simple and can be done by the canners at reasonable cost. [Authors' summary.]

2428. ANDERSON, L. D., AND BROOKS, J. W. 635.656: 632.753

Pea aphid control in Eastern Virginia.

J. econ. Ent., 1947, 40: 199-205, bibl. 4.

Benzene hexachloride containing 0.6 to 0.9% γ isomer gave excellent control of pea aphids when applied as a dust. DDT dust also gave good control; rotenone dusts were less effective. Dusting from ground machines was generally more effective than from aircraft.

2429. SHARMAN, B. C. 612.014.44: 635.67(42)
Short nights: an unappreciated hindrance to maize cultivation in England.

J. roy. hort. Soc., 1947, 72: 195-202, bibl. 11.

North of 53° N. (the Wash) the short summer nights slow down leaf production in maize and so delay flowering that most of the 80 strains grown by the writer failed to produce cobs. In those latitudes he suggests early sowing of Golden Cross in pots in a greenhouse, hardening in a cold frame, transplanting under cloches (avoiding chilly clay) and generous feeding with a complete artificial manure; the early start may enable such a short term variety to complete its vegetative period in time to produce mature cobs.—Leeds.

2430. HEIM, R. 635.8
La culture familiale des champignons alimentaires. Ses possibilités actuelles. (Domestic culture of edible fungi.)
C.R. Acad. Agric. Fr., 1941, 27: 83-9 [received 1947].

Brief notes are given on the domestic culture of the common

* First report *ibid.*, 1945, 38: 183-8; *H.A.*, 15: 1847; second report *ibid.*, 1946, 39: 199-204; *H.A.*, 16: 2148.

mushroom (*Psalliota campestris*), blewits (*Tricholoma nudum*), the straw-mushroom (*Volvaria volvacea*), the poplar *Pholiota* (*P. aegerita*), morels and pezizas.

2431. ROZANOVA, M. A. 557.17: 635.937.34
Regarding the alleged correlation between the content of vitamin C in the fruit, and the form of the sepals among *Rosa* spp. [Russian.]
Sovetsk. Bot., 1946, 14: 287-8.

Çallahjan, *ibid.*, No. 2, 1945, demonstrated a larger content of vitamin C in ripe fruit, the sepals of which are fleshy and erect, than in ripe fruit the sepals of which are slender, easily desiccated, and curl downwards. Both types of fruit belonged to the *R. canina* section. In the present study of 20 spp. of *Rosa* belonging to other sections no such correlation was observed.

2432. TSENG, C. K. 582.73
Seaweed resources of North America and their utilization.
Econ. Bot., 1947, 1: 69-97, bibl. 27.

Agar is produced by water extraction from *Gelidium* spp. on the Pacific Coast and *Gracilaria* spp. on the Atlantic; carrageenin from *Chondrus crispus* and *Gigartina stellata* off Maine, Massachusetts and the Canadian Maritime Provinces; and iridophycin from *Iridophycus* spp. off California and Oregon. Algin is produced by alkali extraction from *Laminaria* and *Macrocystis pyrifera* on the Pacific coast. Production of these colloids in the U.S. was of the order of hundreds of thousands of pounds annually during the recent war. *Macrocystis* and *Nereocystis* are sun dried to yield kelp meal and edible kelp; *Porphyra perforata*, Californian laver, and *Rhodomenia palmata*, East Coast dulse, are dried for food. During the first World War kelp was harvested mechanically to produce acetone, iodine, potash, and kelpchar (a bleaching carbon); in 1917, 394,974 tons of fresh kelp was harvested off California, but present production is about 60,000 tons annually and reserves are large.—Scripps Institution of Oceanography, La Jolla, Calif.

2433. PRYDE-HUGHES, J. E. 677.31.02: 589.77
Teazles.
Agriculture, 1947, 54: 270-2.

The seed of fuller's teazle (*Dipsacus fullonum*) is sown on strong rich land—without the necessity for manure—in March and April. In the following winter, up to February, the seedlings are transplanted 9-12 in. apart in rows about 18 in. apart. This is done with a dibber. Summer cultivation consists in horse hoeing. The flower heads are cut in August, tied in bundles of 50, dried on poles and left in a barn till very dry. The dried heads are sent to wool mills where they are fixed in frames on the wool dressing cylinders.

2434. a ARSAN, E. N. 633.71
Kuru yaprak tütünlerimizin anatomik yapisi hakkında incelemeler. (The anatomy of dry leaf tobaccos.) [English summary 1½ pp.]
Tekel Tütün Institutü Raporlari, 1946, 4: 11-25, bibl. 9 [received 1947].

- b BERTRAND, G., AND SILBERSTEIN, L. 633.71: 546.27
Répartition du bore dans les organes du tabac des paysans. (The distribution of boron in the organs of *Nicotiana rustica*.)
C.R. Acad. Agric. Fr., 1940, 26: 143-6 [received 1947].

- c COOK, R. P., AND BROWN, M. B. 635.656: 633.88
Penicillin production on fractions from the pea (*Pisum sativum*).
Biochem. J., 1946, 40: xxxiv, bibl. 1.

- d DOMOKOS, J. 635.25
Adatok természetett hagymáink taxonomiájához. (A contribution to the taxonomy of the cultivated onion and shallot.) [Hungarian, German summary 1 p.]
Bull. Hungarian Coll. Hort. Vit., 1944, 10: 146-51, bibl. 15 [received 1946].

- e FRAZIER, N. W., AND SEVERIN, H. H. P. 632.8: 635.1/7
Weed-host range of California aster yellows.
Hilgardia, 1944, 16: 619-50, bibl. 12.

- f FREITAG, J. H., AND SEVERIN, H. H. P. 635.53: 632.8
Insect transmission, host range, and properties of the crinkle-leaf strain of western-celery-mosaic virus.
Hilgardia, 1945, 16: 361-71, bibl. 3.

- g FREITAG, J. H., AND SEVERIN, H. H. P. 635.53: 632.8
Transmission of celery-yellow-spot virus by the honeysuckle aphid, *Rhopalosiphum conii* Dvd.).
Hilgardia, 1945, 16: 373-86, bibl. 17.

- h FREITAG, J. H., AND SEVERIN, H. H. P. 635.53: 632.8
Poison-hemlock-ringspot virus and its transmission by aphids to celery.
Hilgardia, 1945, 16: 387-410, bibl. 32.

- i GATTEFOSSE, J. 633.88
L'Ephédra cossonii et l'ephédrinothérapie. (Ephedra cossonii and ephedrine therapy.)
Fruits et Prim., 1947, 17: 11.
Contains 0.4478% total alkaloids.

- j HIBBARD, A. D. 633.491 (778)
Growing potatoes in Missouri.
Bull. Mo. agric. Exp. Stat. 464, 1943, pp. 23 [received 1947].

- k HIBBARD, A. D. 635.615
The Missouri Queen watermelon.
Bull. Mo. agric. Exp. Stat. 502, 1947, pp. 8.
A wilt resistant variety for south-eastern Missouri.

- l HICKEY, J. C. 635.656
How to grow peas for canning and freezing.
Ext. Bull. Me agric. Exp. Stat. 352, 1947, pp. 16.

- m LANGFORD, G. S., AND SQUIRES, D. W. 632.76
DDT, benzene hexachloride and chlordane for Japanese beetle control.
J. econ. Ent., 1947, 40: 269-70.

- n M., A. 633.71(61)
La culture du tabac en Afrique du Nord. (Growing tobacco in North Africa.)
Fruits et Prim., 1947, 17: 55-8.

- o MORGAN, M. F., AND JACOBSON, H. G. M. 635.1/7: 631.8(746)
Soil management for intensive vegetable production on sandy Connecticut Valley land.
Bull. Conn. agric. Exp. Stat. 439, 1940, pp. 556-92 [received 1947].

- p MURAIAMA, S. J. 635.64
Variedades de tomates. (Tomato varieties.)
Rev. Agric., São Paulo, 1947, 22: 100-2.

- q MYERS, A. 635.656: 632.19
"Hollow heart": an abnormal condition of the cotyledons of *Pisum sativum* L.
J. Aust. Inst. agric. Sci., 1947, 13: 76-7.

- r NILSSON, F., AND LINDWALL, H. 635.1/7: 631.521.3
Sortförsök med köksväxter i Norrland. I. Morötter och rödbetor 1938-1944. (Vegetable variety trials in Norrland [Sweden]. I. Carrots and beetroot 1938-1944.) [English summary 2 pp.] Reprinted from *Årsskr. Alnarps Lantbruks-Mejeri Trädgårdst.,* 1947, pp. 27-98, bibl. 17, being *Meddel. Trädgårdsförs.* 40.
- s ROBERTSON, R. N., TURNER, J. S., AND WILKINS, M. J. 581.133.9: 633.41
Studies in the metabolism of plant cells. V. Salt respiration and accumulation in red beet tissue. Reprinted from *Aust. J. exp. Biol. med. Sci.,* 1947, 25: 1-8, bibl. 9.
- t SEVERIN, H. H. P., HORN, F. D., AND FRAZIER, N. W. 632.8: 635.1/7
Certain symptoms resembling those of curly top or aster yellows, induced by saliva of *Xerophloea vanduzeei*. *Hilgardia*, 1945, 16: 335-60, bibl. 40.
- u SEVERIN, H. H. P., AND FRAZIER, N. W. 632.8: 635.1/7
California aster yellows on vegetable and seed crops. *Hilgardia*, 1945, 16: 573-96, bibl. 15.
- v SEVERIN, H. H. P., AND FREITAG, J. H. 632.8: 635.1/7
Additional ornamental flowering plants naturally infected with California aster yellows. *Hilgardia*, 1945, 16: 597-618, bibl. 11.
- w SEVERIN, H. H. P. 632.8
Newly discovered leafhopper vectors of California aster-yellows virus. Abstr. in *Phytopathology*, 1947, 37: 364. Twenty-two species.
- x SIMONNEAU, P. 633.491-1.67
La culture irriguée de la pomme de terre. (The growing of potatoes under irrigation.) *Fruits et Prim.*, 1947, 17: 250-4. In the east of Oran, Algeria.
- y SMITH, F. V. 633.71(772): 338
Costs, returns, and practices in producing tobacco in Jefferson County, Indiana. *S.B. Purdue agric. Exp. Stat.* 519, 1946, pp. 36.
- z WITTWER, S. H., AND HIBBARD, A. D. 633.491
Growing fall potatoes. *Circ. Mo. agric. Exp. Stat.* 301, 1945, pp. 4 [received 1947].

FLORICULTURE.*

2435. TAYLOR, G. 91.041: 581.9(515)
Plant collecting in south-eastern Tibet. *J. roy. hort. Soc.*, 1947, 72: 130-44, 166-77.
A fascinating account, including excellent coloured photographs, of an expedition in 1938 to the source of some of our finest Alpines. It is to be hoped that some of the seeds collected may eventually give rise to new cultivated varieties.
2436. KLEINER, P. 635.967.2
Rusticité des plantes alpines et leur protection hivernale. (The hardiness of alpine plants and their protection in winter.) *Rev. hort. suisse*, 1946, 19: 15-18.
Only very few alpine plants require winter protection if planted in favourable conditions. Protection is unnecessary, where sufficient snow can be relied upon. Where a cover is provided, e.g. for new plantings, it should be removed on cloudy days.
2437. WILSON, G. F. 635.939.98: 632.651.3
The chrysanthemum eelworm and its control. *J. roy. hort. Soc.*, 1947, 72: 364-9.
Stools may be cleared of the leaf eelworm, *Aphelenchoides ritzema-bosi* Schwartz, by warm water treatment. The stools should be washed thoroughly, drained, held at 110° F. for 20-30 minutes under water, plunged into cold water, drained, and replanted in clean soil.
2438. WHITE, H. E. 632.654.2: 635.936.69
Sodium selenate as a red spider control. *A.R. Mass. agric. Exp. Stat.* 1945/46, p. 45, being *Bull.* 436.
Sodium selenate was applied at the rate of $\frac{1}{2}$ g. in a quart of water per sq. ft. of soil. Young carnations in flats remained free of red spider for 5-6 months, and plants in benches for 10 months, after treatment.
2439. (FULLER, R. G., AND KIPLINGER, D. C.) 635.939.98: 632.6/7
Selenium as repellent. *Agric. Chem.*, 1946, Vol. 1, No. 8, from abstract *Ill. Hort.*, 1947, Vol. 36, No. 1, $\frac{1}{2}$ p.
Applications of sodium selenate at the rate of about 0.5 g. * See also 1897-1899, 1901, 1989, 2199.
- per square foot of soil surface gave complete control of certain common greenhouse pests of chrysanthemums and partial control of others. The effect of selenium compounds on carnation and hydrangea pests was also studied. Plants badly infested at the time of infestation required some other control measure for an initial period until the selenium had reached a toxic concentration in the foliage.
2440. HÄFLIGER, E. 635.939.98: 632.771
La cécidomye des chrysanthèmes. (The chrysanthemum gall midge.) *Rev. hort. suisse*, 1946, 19: 129-33.
Chrysanthemums should be treated twice weekly with Gésarol [DDT] for 1 to 1½ months. Dust should be used under glass, 1% spray in the open.
2441. WARNE, L. G. G. 635.937.36: 577.17
Bud and flower dropping in lupins. *J. roy. hort. Soc.*, 1947, 72: 193-5, bibl. 4.
Inflorescences of lupins were sprayed with (1) α -naphthyl-, (2) β -naphthyl-, (3) β -indolylacetic acids, 4 or 5 hours after cutting, at concentrations of 400 or 800 p.p.m. With (1) and (3) there was a great reduction in the amount and rate of shedding buds and flowers shown in the controls, which were sprayed with water alone.—Manchester.
2442. CRONSHAY, J. F. H., AND WESTON, W. A. R. D. 635.936.69: 632.4
A disease of *Gypsophila elegans*. *Gdnrs' Chron.*, 1947, 122: 108, bibl. 1.
The disease caused by *Sclerotinia serica* may be avoided by sowing gypsophila in the spring.
2443. CASAMAJOR, R. 635.938.23
Tracing the story of *Camellia reticulata*. *Horticulture (J. roy. N.Z. Inst. Hort.)*, 1947, 16: 3: 17-24.
Historical and botanical notes on the cultivated form of *Camellia reticulata*, of the wild species, and of the form *flore-pleno*.
2444. BARRETT, J. T., AND HARDMAN, D. A. 635.939.872: 632.4
Myrothecium leaf spot and canker of gardenia. Abstr. in *Phytopathology*, 1947, 37: 360.
Myrothecium roridum, which causes leaf spot and canker

of gardenia, is now known to attack gardenia cuttings in rooting beds under high humidity and high temperature conditions. Infection of tomato plants and fruit confirm in part work done in England.

2445. BAKER, K. F. 635.937.513: 632.4
Heterosporium disease of nasturtium and its control.

Abstr. in *Phytopathology*, 1947, 37: 359.

Nasturtium seed fields in coastal California are often damaged by an undescribed *Heterosporium* leaf spot. The fungus, internally carried in the seed, infects the stem from the old hypogeally germinated seed. Excellent control was obtained, with only 3-3% average germination loss, by treating seed 30 minutes in water at 51-7° C. after a 1-hour soak in cool water.

2446. WALKER, W. F. 635.976
Hedges.

Tasm. J. Agric., 1946, 17: 344-6.

Hedges are discussed under: selection of plants, types of hedge, planting, and pruning and cutting. Plants are named for the following type of hedges: garden ornamental, screens, shelter, barrier and defensive, for dry situation, for coast and seaside and for edging.

2447. HASEMAN, L. 634.975: 632.78
Controlling bagworm on evergreens.
Circ. Mo. agric. Exp. Stat. 287, 1944, pp. 2 (received 1947).

In recent years many ornamental evergreens and native red cedars have been destroyed by bagworms, which also attack box elder, willow, maple, fruit trees and other shade and ornamental trees and shrubs. The life history and habits of the bagworm are outlined. To control this pest the bags should all be collected and destroyed. Spray not later than the first of June, using 3-5 lb. lead arsenate in 100 gal. water (1-2 tablespoons per gallon), or, for dusting, mix 1 part of lead arsenate with 5 parts of flour or lime and apply early in the morning when the dew is on.

2448. BROMLEY, S. W. 635.977: 632.6/7
Recent advances in control of ornamental and shade tree insects.
J. econ. Ent., 1947, 40: 237-9.

A resin emulsion of pyrethrum and rotenone controlled, among other pests, the European red mite, *Paratetranychus pilosus*, on apple and cherry, and the garden red spider, *Tetranychus bimaculatus*, on philox. Benzene hexachloride did not damage the foliage of 40 tree species. DDT was used in other tests; its use at blossom time was disastrous.

2449. ANON. 635.977: 632.78
The bag-shelter moth *Ochrogaster contraria*.
Agric. Gaz. N.S.W., 1947, 58: 305-7.

The caterpillars of the bag-shelter moth attack and sometimes completely defoliate groups of weeping myall or boree trees (*Acacia pendula*), growing in western and south-western districts of New South Wales, where these trees are used for ornament or shade purposes around homesteads, or for fodder in times of drought. The life history of the insect is described and control measures are discussed.

2450. SMITH, R. H. 632.752: 635.976
Bionomics and control of the nigra scale, *Saissetia nigra*.
Hilgardia, 1944, 16: 225-88, bibl. 105 [received 1947].

A very full account of this important pest of ornamental shrubs and trees in the coastal regions of California and its control by biological means (*Metaphycus helvolus* among others) and sprays.

2451. KRUG, H. P. 635.937.34: 631.541.17
Algumas investigações sobre portaenxertos para as rosas de chá híbridas. (Rootstocks for tea roses.)
Rev. Agric. São Paulo, 1947, 22: 21-36, bibl. 6.

An account is given of the propagation of tea roses in São Paulo using three rootstocks, *Rosa chinensis* var. *Manetti* (*R. indica*), *R. multiflora japonica* (a thornless variety) and *R. rugosa*. The advantages and disadvantages of these rootstocks are discussed, and certain experimental data on rooting and the losses from rotting of cuttings are tabulated.

2452. BRADFORD, S. C. 635.937.34: 577.17
Some experiments with Hormomone A.
J. roy. hort. Soc., 1947, 72: 395-9.

Rose bushes treated with a dilute solution of Hormomone A grew more vigorously and produced larger flowers than did bushes that were not watered. Roses whose roots were soaked overnight in a similar solution generally showed the effects of transplanting less than did those whose roots were soaked in water.

2453. MCKENZIE, W. F. 635.944(42)
Experimental work on bulbs [at Kirton, Lincs., 1930-1940].
Kirton agric. J., Sept. 1946, No. 11, pp. 35-42, bibl. 14.

A note is given on the increase of the bulb acreage in the Holland division of Lincolnshire up to nearly 5,000 acres in 1938 plus about 70 acres glass followed by a decrease of about 75% during the war. This precedes an outline of the bulb work done at Kirton between 1930 and 1940. Most of it concerned tulips and daffodils and was of an immediate practical nature to help those producing bulbs for the dry bulb trade, but at the end of the period the chemists and biologists were devoting much time to more fundamental work. The following facts were established: Both tulips and daffodils gave the greatest increase in dry bulb weight when planted in September and not later. Tulips planted 3-4 in. deep produced bulbs of better shape and colour than those planted deeper. Planting at 3-5 in. gave the best results with daffodils. The cumulative effect of cropping flowers several successive years was to inhibit bulb production. For weed control calcium cyanamide at 5 cwt. per acre applied before the appearance of the shoots proved best. Tulips grew better when there was plenty of lime, while daffodils preferred a slightly acid medium. Manurial trials were disappointing. Certain progress was made in investigations into the chemical composition of hyacinths and tulips in relation to size, and in tulips this was found to be related to morphological structure. Pest control by hot water treatment was investigated until 1939 and results published in *J. roy. hort. Soc.*, 1944, Vol. 69 (noted *H.A.*, 15: 243). Shirian A.G. (a salicylanilide preparation) proved useful against fire (*Botrytis tulipae*), but grey bulb rot did not yield to chemical treatment. The addition of 1 part formalin to 400 pts. water in the hot water treatment of narcissi increased any damage caused by the treatment but did not do any damage when the hot water treatment itself was innocuous.

2454. VAN SLOGTEREN, E. 635.944
De bloembollencultuur en hare technische problemen. Een terugblik. Een blik in de toekomst. (Bulb culture and its technical problems. A glance into the past and into the future.)
Publ. Lab. Bloembollenonderz. Lisse 70, 1941, 36 pp. [received 1947].

A popular, illustrated account of modern methods of controlling diseases and improving the culture of flowering bulb plants.

2455. WELLENSIEK, S. J. 635.939.183
De veredeling van cyclamen. (Cyclamen improvement.)
Reprint from *Vakbl. Bloemisterij*, 1947, 2, Nos. 20 and 21, being *Overdr. Lab. TuinbouwPleelt* 35, 1947, 6 pp.

Methods for improving cyclamens are discussed under: (1) Introduction (what is meant by improving). (2) The

characteristics of the cyclamen from the point of view of general improvement. (3) Improvement within the variety (mass selection and race selection). (4) Improvement by crossing varieties or species. (5) Heterosis—crossing.

2456. BUTTERFIELD, H. M. 635.944: 631.532.1
Production of Easter lily bulbs.
Circ. Calif. agric. Ext. Serv. 132, 1947, pp. 34, bibl. 34.

Most of the varieties grown in California for sale as bulbs for forcing in the eastern United States belong to *Lilium longiflorum*. Full details are given here of large scale production of bulbs. They are grown in a 3- or 4-year rotation and are preceded by a cover crop. Directions are given for dealing with aphids, various beetles, thrips, eelworm, various fungus and virus diseases and for harvesting, grading and storing.

2457. GOULD, C. J., BREAKLEY, E. P., AND COURTNEY, W. D. 635.944: 632.95
1947 spring recommendations for control of diseases and insects of bulbous crops in Western Washington.
Mim. Circ. Western Wash. Exp. Stat. Puyallup 138, 1947, pp. 2.

Treatments in tabular form for certain diseases and pests which attack narcissi, irises, tulips, gladioli and lilies in Washington.

2458. GOULD, C. J. 635.944: 632.482
The comparative value of certain organic and inorganic sulphur compounds in the control of *Botrytis* blight of tulips.
Abstr. in Phytopathology, 1947, 37: 361-2.

The best material in each of 5 years' tests was Fermate 2 lb./100 gal.

2459. RYAN, R. W. 635.944: 632.4
Gladioli disease control.
Wis. Hort., 1947, 37: 163.

Fusarium rot may be reduced by inspecting the scar below the new corm at cleaning time and rejecting all doubtful corms; all prematurely yellow plants must be removed from the field. New Improved Ceresan has been successfully used as a dip in many parts of the U.S. *Botrytis* may be reduced by rapid drying, or by dusting with Folasan (pentachloronitrobenzene). *Scab* may be controlled by mercuric chloride, or New Improved Ceresan dips, but it appears to be influenced by soil conditions and fertilizer treatment.

2460. ZOBRIST, L. 639.938.46: 632.4
L'oidium des bégonias. (*Oidium* on begonias.)
Rev. hort. suisse, 1946, 19: 109-14, bibl. 2.

For prophylaxis begonias (particularly the variety Gloire de Lorraine) should be sprayed monthly with 0.1% Cupromag (copper carbonate) + 0.3% Déril; the second constituent gives protection against insects.

2461. TOMPKINS, C. M., AND TUCKER, C. M. 585.471: 632.411

Leaf blight of pink calla caused by *Phytophthora erythroseptica*.

Phytopathology, 1947, 37: 382-9, bibl. 13.

A leaf blight of pink calla (*Zantedeschia rehmannii*) is caused by a fungus morphologically similar to *Phytophthora erythroseptica* Pethybr., but the isolates from calla do not cause pink rot of potatoes. The symptoms are a rapid wilting, yellowing and collapse of the leaves, with blackening of the petioles at and slightly above and below soil level. Death of the foliage occurs in a few days. The disease is favoured by wet, poorly drained soil and by cool, foggy weather. Crop rotation and sanitation are suggested as a method of control.

2462. a ABBISS, H. W. 635.944: 635.936.751
Anemone corm production.
Nurseryman and Seedsman, 21 Feb., 1946, 2 pp.
For the commercial flower grower in England.

- b BODMER, H. 635.936.39
La culture de l'oeillet sur la Côte d'Azur.
(Growing carnations on the Côte d'Azur.)
Rev. hort. suisse, 1946, 19: 280-5.

- c BURKWOOD, A. 635.976.3
The genus *Viburnum*.
J. roy. hort. Soc., 1947, 72: 360-4.

- d GHOSE, B. N. 635.939.183: 631.531
Germination of *Primula petiolaris* seeds.
Gdnrs' Chron., 1947, 122: 110.

- e GIMESI, N. 635.944: 581.145.1
A *Lilium martagon* antherájának fejlődésélettana.
(The physiology of anther development in the Martagon lily.)

- Bull. Hungarian Coll. Hort. Vit.*, 1944, 10: 209-22, bibl. 9 [received 1946].

- f MAAG, R., AND ZOBRIST, L. 635.9: 632.2/9
Schädlinge an Zierpflanzen. (Pests and diseases of ornamental plants [and their control].)
Verlag Chemische Fabrik Dr. R. Maag A.G.—Dieseldorf—Zürich, 1947, pp. 62.
A well-illustrated book.

- g OSTERWALDER, A. 635.939.98: 632.4
Les maladies cryptogamiques de la Reine-Marguerite. (Fungus diseases of the aster.)
Rev. hort. suisse, 1947, 20: 201-3.

- h THOMAS, I. 635.939.98: 632.753
Injury to aster seedlings by the leaf curling plum aphid (*Anuraphis helichrysi* Kalt.).
J. roy. hort. Soc., 1947, 72: 369-70.

- i WILSON, G. F. 635.937.34: 632.793
The leaf-rolling rose sawfly, *Blennocampa pusilla* Klug.
J. roy. hort. Soc., 1947, 72: 155-8, bibl. 4.

CITRUS AND SUB-TROPICALS.*

2463. SWINGLE, W. T. 634.3
The botany of the citrus fruits and their wild relatives as a guide to their use in breeding.
Proc. Fla. St. hort. Soc., 1943, pp. 156-64 [received 1947].

An account is given of citrus introductions into the U.S.A. since 1894 and of breeding work undertaken with them. The list of tribes, subtribes, genera, and species of the orange subfamily now available to plant-breeders in the U.S.A. is impressive. A description is given of some relatives of citrus, including the Bael fruit (*Aegle marmelos*)

and the Wampee (*Clausena lansium* and *C. dentata* var. *dulcis*).

2464. SIMONET, M., AND CHOPINET, R. 634.3(449)
Contribution à l'étude des collections vivantes botaniques et horticoles de la Villa Thuret. I. Les agrumes. (The plant collection at the Villa Thuret. I. Citrus.)
Fruits d'Outre-Mer, 1947, 2: 140-9, 179-86, bibl. 61.

A history of the Villa Thuret, Antibes (now the Centre de Recherches Agronomiques de Provence), is followed by an account of the citrus complex. The authors describe the cultivation of citrus in the south of France.

* See also 1890, 1910, 2061, 2078, 2191.

2465. FROST, H. P. 634.3(794)-1.523

Citrus varieties for California.

Calif. Citrogr., 1947, 32: 286, 300-4.

The merits of the following varieties are discussed, some of which have not yet been released for trial and distribution. Oranges: Trovita, Temple, Shamouti, Pine-apple and Indian River. Mandarines: Kinnow, Wilking, Kara, Honey and Clementine. Tangors: Ruddy and Dweet. Tangelos: Minneola, Orlando, Clement and Thornton. On the subject of young-lines (nucellar-seedlings) of old clonal varieties, it is suggested that it may be desirable with some varieties to use young-line trees for commercial propagation since they are thought to be more vigorous. When considering the relationship between cross-pollination and seediness it is important with any new seedy variety to learn whether its fruits are less seedy when the variety is grown in isolation and, if so, whether the decrease in seediness is accompanied by a decrease in yield of fruit.

2466. SIMONNEAU, R., AND MAURI, N. 634.322(65)
La clémentine "Montréal". (The Montréal Clementine.)

Ann. Inst. agric. Algér., 1946, 3: 23-46.

A description of the origin of this variety, its characteristics and its reactions to different environments in Algeria. It is concluded that being earlier, and more productive, than the common Clementine it will fill a gap in the early season.

2467. COSTE, A., AND BLONDEL, L. 634.322(65)
Note sur la Satsuma "Saigon". (A note on the Saigon satsuma.)

Ann. Inst. agric. Algér., 1946, 3: 48-55.

A description of this variety and some figures which suggest that it ripens earlier than the ordinary Satsuma mandarin grown in Algeria.

2468. FAIRCHILD, D. 634.3-1.524
The Alamoen—a citrus fruit of the tangelo type from Paramaribo [Surinam].

Proc. Fla. St. hort. Soc. 1946, pp. 151-5.

An illustrated description of a little known fruit which is said to possess a characteristic and delicious flavour and to be "squirtless". Its fruit-follicles are large, full of juice, thin-walled and loosely packed in their segments. It is less juicy than the grapefruit. A tree for the amateur rather than the commercial grower.

2469. FAIRCHILD, D. 634.3-1.541.11
In defense of the Bael fruit, *Aegle marmelos*.
Proc. Fla. St. hort. Soc. 1943, pp. 165-71 [received 1947].

An account of this citrus relative, written mainly from the standpoint of its eating qualities about which opinions differ. The author recalls some unfavourable receptions given in the U.S.A. to grapefruit, avocados, papayas and mangoes when first introduced and pleads for a fair trial for the Bael fruit and other exotics. It is recorded that Bael fruit can be grafted on to the following: *Afraegle gabonensis*, *A. chevalieri*, *A. paniculata* and *Swinglea glutinosa*.

2470. GUILLAUMIN, A. 634.3(59)
Les agrumes d'Indochine. (Citrus in Indo-China.)
Fruits d'Ostre-Mer., 1947, 2: 134-9, bibl. 15.

The author notes the confused state of the systematics of *Citrus*, a genus not susceptible to analysis in the herbarium. He here lists 18 types, with native names.

2471. FAUVEL, J. H. 634.3(5)
Les meilleurs citrus et les espèces proches parentes d'Extrême-Orient à introduire en Afrique du Nord. (The best citrus and related species of the Far East for introduction to North Africa.)
Rev. Hort. Agric. Afr. N., 1945-46, 49-50: 31-8, 54-6 [received 1947].

The author enlarges upon his earlier paper *ibid.*, 1942,

46: 62-8; see *H.A.*, 14: 1315] in the light of a long tour of the Far East. Thirteen genera and 17 species, related to *Citrus*, are listed as of possible value in North Africa, either for use as rootstocks or for breeding rootstocks. *Citrus suhuiensis* Hort ex Tanaka is an edible species which includes three types: the Suhuikan, the Liman Hjian Manis and the Singapore mandarin (*C. retusa* Hort ex Tanaka (non Berkill)). The Suhuikan has large flattish fruit, with thin loose skin, coloured deep orange, and large seeds; it is propagated by marcot and planted at 3½ m² square. These should be introduced to North Africa, with the Ponkan (*C. poonensis*) and Tankan (*C. tankan*) and certain Indian hybrids.

2472. MASSIBOTI, J. A. 634.3(663)
Conditions techniques à réaliser pour obtenir des plantations d'agrumes de rapport au Sénégal. (Technical requirements for establishing citrus plantations in Senegal.)
Fruits d'Ostre-Mer, 1946, 1: 470-6; 1947, 2: 12-16.

A popular article, part I of which deals with choice and preparation of soil, windbreaks, irrigation, manuring, planting, pruning, the thinning of citrus fruit, their diseases and pests. Part II, which contains excellent photographic illustrations of sixteen kinds of citrus fruits, is devoted to varieties, stocks and nurseries.

2473. YOREL, —. 634.3(61)
Problème des agrumes en Afrique du Nord. I. La Clementine. II. Oranges. III. La Mandarine. IV. Les Citrons. (Citrus in North Africa. I. The Clementine. II. Oranges. III Tangerines. IV. Lemons.)
Fruits et Prim., 1946, 16: 64-8, 97-103, 170-3, 357-62.

The author reviews the export trade from French North Africa in competition with other producing countries. The Clementine needs further research into culture and shipping, but could easily be established in the markets of France by careful exploitation of its qualities. The earlier oranges can be exported with little competition, but later varieties would have to be sold or processed locally. Tangerines from French North Africa are readily saleable for Christmas and New Year. The French market for lemons could be expanded by the help of propaganda, and part of the crop should be stored to extend its season. Scientific and commercial co-operation between the three French territories is called for, not only in standardization of varieties, but also in problems of storage and shipping.

2474. BRICHET, J. 634.3(64)
A travers les orangeries du littoral Constantinois. (The orange groves of the Constantine seaboard.)
Fruits et Prim., 1946, 16: 129-36.

Much of the citrus has been ruined by unnecessary and empirical pruning, faulty cultivation and irrigation. Cultural and manurial practices should be rationalized to take advantage of the favourable climate.

2475. SIMONNEAU, P. 634.31-1.415.3
La création d'une orangerie en terrain salé. (Establishing oranges in saline soil.)
Fruits et Prim., 1947, 17: 93-6.

Salt accumulation destroyed vineyards near Perregaux, Algeria, about 1890. In 1937 the permeable soil between 30 and 70 cm. below the surface contained over 0.7% NaCl, and supported a crop of barley or oats every 3-5 years. In 1937 pottery drains spaced 5 m. apart were buried 1.20 m. deep to discharge into open drains; frequent heavy irrigation allowed the owner to establish an orchard of Thompson Navel oranges.

2476. MCGILLIVRAY, K. D. 588.427: 634.3
Passion fruit and citrus. Partners or rivals.
Agric. Gaz. N.S.W., 1947, 58: 356-7.

The intercropping of citrus trees with the passion vine is

advocated so that some cash return can be obtained while the citrus trees are still young. The two essentials to successful passion-fruit growing, apart from pest and disease control, are (1) the maintenance of fertility and (2) the minimizing of soil erosion. To ensure a successful partnership of passion fruit and citrus, it is necessary to start well balanced manuring during the growing of the passion fruit crop, and not to allow the convenience of square planting of passion vines to interfere with the contour planting of the citrus orchard.

2477. (SUNDAYS RIVER RESEARCH STATION.) 634.3(68)

Experimental work at Sundays River [in 1945].*

Citrus Gr, 1946, No. 147, pp. 3-5.

Project 1.—Fertilizer trial with Valencia: small differences were maintained; treatment 4, 15 tons of kraal manure per acre, increased the acidity of the fruit, and the rind was so coarse and weak from the heavy application of N that superphosphate (8 lb. per tree) has been added on split plots.

Project 3.—Stem pitting: this disorder of grapefruit may be transmitted by budding. In addition to pitting of the stem, affected trees are generally dwarfed, branches tend to grow downwards, fruiting may be precocious and the foliage mottled. Symptoms have also been found on Valencias.

Project 4.—Sulphur has reduced the pH of alkaline soils, but proper irrigation and fertilization have more effect on the health of trees. *Project 5.*—Irrigation: rainfall and irrigation water were below optimum and crops low, but the basin method has been more effective than flooding.

2478. (SUNDAYS RIVER RESEARCH STATION.) 634.3(68)

Annual report of the Sundays River Citrus Research Laboratory [for 1946].

Citrus Gr, 1947, No. 161, p. 10.

In a brief note, the reviewer points out that the severe drought and lack of irrigation water so upset fruiting that no analysis of yields was possible; and when irrigation became possible, it led to the setting of a heavy out-of-season blossom, thought likely to affect the main 1947 crop. *Pitted stem.*—Results agree with those reported in 1945.

2479. BARTHOLOMEW, E. T., AND SINCLAIR, W. B.

634.3-2.19

Bud selection and granulation.

Calif. Citogr., 1947, 32: 94, 106, 123-4.

A summary is given of earlier results of investigations into granulation in citrus fruits, a condition reported from 9 countries, as well as California. The results of bud-selection studies undertaken by the authors are then summarized, from which it is concluded that it would be very difficult to find a mutant whose progeny would not produce granulated fruit.

2480. TAI, E. A. 634.3-1.541.11

Producing good citrus nursery trees. I. Growing the rootstock.

Ext. Circ. Jamaica Dep. Agric. 5, 1947, pp. 10.

The only important rootstocks used in Jamaica are: sour orange, hog shaddock and rough lemon. Sour orange is the most widely used. Directions are given for raising seedling rootstocks.

2481. DEAN, R. E. 634.3-1.541.5

The propagation of citrus.

Proc. agric. Soc. Trin. Tob., 1946, 46: 133-7.

A description of the technique adopted at St. Augustine Experimental Station, Trinidad. Sour-orange seedlings are used as rootstocks. The shield, or inverted T, method of budding is described.

2482. CAMP, A. F. 634.3-1.541.11

The present status of rough lemon rootstock.

Proc. Fla. St. hort. Soc. 1941, pp. 75-81, bibl. 7 [received 1947].

The author states that time can be better spent in studying the conditions necessary for the production of good fruit on rough lemon rootstock than in the search for a new stock.

* *Project 2* is mentioned in earlier report [H.A. 15: 246] but not here.

2483. SAVAGE, E. M., COOPER, W. C., AND PIPER, R. B. 634.31-1.541.11

Root systems of various citrus rootstocks.

Proc. Fla. St. hort. Soc. 1945, pp. 44-8, bibl. 4.

The root-systems of 15 different citrus rootstocks budded to Parson Brown orange are described and illustrated. Many striking differences were observed. The rough-lemon and Cuban shaddock had the most extensive root-systems, the calamondin the deepest, and the sweet-lime and grapefruit the greatest abundance of fine, fibrous roots. All stocks had more or less deeply penetrating tap-roots, except the sweet-lime. The root-systems of the bittersweet orange sweet-orange, mandarin, and citrange penetrated approximately as deeply and had nearly the same lateral spread as the root system of the sour-orange. [From authors' summary.]

2484. SWINGLE, W. T. 634.3-1.541.11

New disease-resistant rootstocks urgently needed by citrus growers.

Proc. Fla. St. hort. Soc. 1945, pp. 201-5, bibl. 1.

Attention is called to the increasing danger that rootstock troubles may arise in regions that have previously been free from them. The importation of citrus species and their wild relatives for trial as rootstocks is advocated. A list of citrus genera and wild relatives of the tribe *Aurantioideae* is given.

2485. FURR, J. R., REECE, P. C., AND HRNCIAR, G. 634.3-1.541.11

Identification of hybrid and nucellar citrus seedlings by a modification of the rootstock colour test.

Proc. Fla. St. hort. Soc. 1946, pp. 38-42, bibl. 1.

The rootstock colour test of Halma and Haas was adapted for the rapid testing of small samples of citrus leaves from 3,800 seedlings of 37 crosses in an attempt to distinguish between hybrid and nucellar seedlings. It is concluded that this test serves as an additional aid when separating zygotic from nucellar seedlings.

2486. BATCHELOR, L. D., AND BITTERS, W. P. 634.323-1.541.11

Rootstocks for Marsh grapefruit in California.

Calif. Citogr., 1947, 32: 282, 294, 296.

The subject of choice of rootstocks is briefly reviewed and the records from two experimental orchards on 13 rootstocks are considered from the standpoint of yield and quality.

2487. REECE, P. C. 634.31: 581.145

The set of sweet orange fruit in relation to the type of bloom.

Proc. Fla. St. hort. Soc. 1945, pp. 105-8.

Evidence is presented which shows that bloom on new wood is superior for fruit-set to that developed on old wood. This is contrary to general belief. In groves in which the bloom is almost all of the leafless (old wood) type a change to a predominantly leafy (new wood) type would result in a large increase in fruit production.

2488. OBERHOLZER, P. C. J. 634.3-1.541.11

The Bitter Seville rootstock problem.

Fmg. S. Afr., 1947, 22: 489-95, reprinted in

Citrus Gr, 1947, No. 163, pp. 18-20, bibl. 3.

A short preliminary report on the behaviour of Bitter Seville or sour orange and other citrus species used in certain stock-scion combinations in South Africa. The following tentative conclusions are reached. That the incompatibility reactions exhibited by certain stock-scion combinations of citrus in South Africa are probably caused by a virus, which is present in a latent form in certain species or varieties (e.g. Valencia orange), and only causes pathological conditions when certain stock-scion combinations are made. Preliminary results indicate that such a virus is satisfactorily (if only temporarily) eliminated by

taking the infected, but apparently healthy, scion variety through the seed, making use of the well-established principle of "nucellar embryony" characteristic of the genus *Citrus*. By using buds from such nucellar seedlings, healthy and exceptionally vigorous budlings have been produced of hitherto incompatible combinations, e.g. Valencia orange on sour-orange and lemon rootstocks. Provided infection does not take place mechanically, or by means of an insect vector, such plants will probably continue to make healthy growth. The insertion of buds of the particular scion variety (e.g. Valencia orange), taken from a normal budded orchard tree, into such healthy budlings causes infection within a relatively short time, resulting in the typical symptoms of decline, root decay, etc. This tends to indicate that the virus is readily transmitted by budding. It would appear from experience and general information available, that the incompatibility reactions found in South Africa, Java and parts of India, especially so far as the sour-orange is concerned, probably bear a direct relation to the problems of tristeza and quick decline, and that the underlying cause in each case is probably a virus. Furthermore, experience in South Africa and elsewhere strongly suggests that this virus is infectious, being distributed both by budding and in other ways.—Agric. Res. Inst. Univ. Pretoria.

2489. FURR, J. R., COOPER, W. C., AND REECE, P. C. 634.3: 581.145.1

An investigation of flower formation in adult and juvenile citrus trees.

Amer. J. Bot., 1947, 34: 1-8, bibl. 9.

In adult Cleopatra flower initiation occurs about December. Adult Valencia appears to be indifferent to photoperiod. Juvenile scions did not flower in the first year after grafting on adult stocks, except occasionally when the latter were ringed. Juvenile nucellar seedlings of tangelo and citrange, ringed in June, flowered the following year at the age of 7; with similar seedlings of grapefruit and sweet orange, four years younger, this treatment was only occasionally successful.—Bur. Pl. Ind., U.S.D.A.

2490. HARDING, P. L., AND LEWIS, W. E.

634.3: 581.192

The relation of size of fruit to solids, acid and volume of juice in the principal varieties of Florida oranges.

Proc. Fla. St. hort. Soc. 1941, pp. 52-6 [received 1947].

The results show how size of fruit affects total solids, total acidity and volume of juice prior to and throughout harvest.

2491. HARDING, P. L., AND WADLEY, F. M. 634.31

Study of quality in Temple oranges.

Fd Res., 1945, 10: 510-17, reprinted in *Proc. Fla. St. hort. Soc.* 1946, pp. 16-20, bibl. 5.

Palatability, acidity and solids showed marked seasonal trends. The influence of rootstocks was not pronounced. Palatability was highly correlated with both acidity and solids. Tasters showed differences, but not large ones, in their judgments.

2492. SINCLAIR, W. B., AND ENY, D. M.

634.31: 581.192

Ether-soluble organic acids of mature Valencia orange leaves.

Plant Physiol., 1947, 22: 257-69, bibl. 22, being *Pap. Calif. Citrus Exp. Stat.* 555.

The acid fraction of the water solution of the ether extract of leaves contained 12.28% citric, 30.57% malic, 39.38% oxalic, and 17.76% of unidentified acid. In the leaves most of the oxalic acid was insoluble in water; the citric and malic acids were soluble, and with the Ca and K ions they provided the buffer capacity of the leaf sap. The proportion of citric to malic acid is roughly 1:3 in the leaf, and 8:1 in the fruit juice; either there must be a conversion during transfer to the pulp, or citric acid must

be synthesized in the juice vesicles—the authors consider the latter to be more likely.

2493. TURRELL, F. M.

634.3: 581.49

Citrus leaf stomata: structure, composition, and pore size in relation to penetration of liquids. *Bot. Gaz.*, 1947, 108: 476-83, bibl. 25, being *Pap. Calif. Citrus Exp. Stat.* 557.

An anatomical study indicates that citrus stomata are not penetrated by water, but may be penetrated by oil. Washington Navel and Valencia oranges, Eureka lemons and Marsh grapefruit were studied.

2494. HARDING, P. L., AND DYER, R. M. M.

634.31-1.542.27

Effect of thinning on some of the physical and chemical characters of Valencia oranges.

Proc. Fla. St. hort. Soc. 1942, pp. 34-8, bibl. 5 [received 1947].

From the results of this preliminary study, there does not appear to be any economic or physiological reason for thinning the fruit of Valencia orange trees in Florida. The trees show very little tendency towards biennial bearing. [From authors' summary.]

2495. BRIEGER, F. G., AND MOREIRA, S. 634.31-1.55

Uniformidade da produção numa experiência de adubação da laranjeira Baía. (Uniformity data on Washington Navels preceding a manual experiment.) [English summary 3 pp.]

Bragantia, 1941, 1: 619-67, bibl. 4 [received 1947].

The analysis of yield data for the first three years of bearing in Washington Navel orange trees shows considerable variation, despite all precautions. Eventually the sub-plot was established as a line of 8 trees, with a single guard row; 6 units form a whole plot, of which there are 4 per block, with 7 replications. Biennial bearing is marked in part of the field. The authors point out that the coefficient of variability decreases rapidly as the mean number of fruits per tree increases to about 100, and suggest that in the analysis of such data it should be used instead of the standard error.—Limiera Experiment Station, São Paulo, Brazil.

2496. ROY, W. R., AND GARDNER, F. E. 634.31-1.8

Seasonal absorption of nutrient ions by orange trees in sand culture.

Proc. Fla. St. hort. Soc. 1945, pp. 25-36, bibl. 4.

A record is presented of monthly absorption of water, N, P, K, Mg and Ca by two groups of Parson Brown orange trees in sand cultures. The striking behaviour of the trees with respect to seasonal nutrient uptake raises the question as to whether fertilization programmes could not be made more efficient by varying the formula to comply more nearly with the seasonal ability of the trees to absorb the various ions, thereby avoiding excessive loss by leaching. [From authors' summary.]

2497. CHAPMAN, H. D. 634.3-1.8

Citrus fertilization: some contrasts between California and Florida.

Calif. Citrogr., 1947, 32: 383, 394, 396-7.

A comparison is made between the soils, climates and fertilizer programmes in Florida and California. Manuring of citrus is still far from being an exact science.

2498. MYNHARDT, C. B. 634.3(68)-1.8

Fertilizing and manuring citrus orchards in the Eastern Cape Midlands.

Citrus Gr. 1946, No. 149, p. 1.

Sulphate of ammonia is recommended at the rate of 1½ lb. N per adult tree, applied before spring growth begins. Around Grahamstown 5 lb. phosphates should be applied to ensure good quality fruit. Manure or compost is also desirable; and if water is available cover-crops should be grown, vetches and barley for winter and cowpeas or sunhemp for summer.

2499. JOUBERT, G. F. 634.3(68)-1.8
Manuring and fertilizing citrus orchards in the Western Cape Province.
Citrus Gr. 1946, No. 150, p. 9.
Manure or compost should be applied annually. Lime is necessary, and dolomite should be included where bronzing occurs.
2500. (SUNDAYS RIVER RESEARCH STATION.) 634.3-1.874/5
Fertilizer and nutritional investigations: cover crops and mulches.
Citrus Gr. 1947, No. 158, pp. 11-12.
A report summarizing work done since 1931. *Fertilizers*.—Kraal manure (free from alkali) should be applied annually at 5-10 tons per acre, supplemented with 5-7 lb. ammonium sulphate or nitrate per tree; precipitated zinc oxide should be sprayed where mottle-leaf occurs. *Mulches*.—Lucerne hay, 100 lb. per tree, proved to be the best material to check weed growth. *Cover crops*.—Field peas should be sown in March as a winter cover in Navel and grapefruit orchards, where soil moisture allows.
2501. FUDGE, B. R. 634.3: 581.192: 631.8
The mineral composition of citrus juice as influenced by soil treatment.
Proc. Fla St. hort. Soc. 1941, pp. 4-12, bibl. 3 [received 1947].
The large amounts of materials that must be applied to the soil to produce a relatively small increase in the mineral composition of the juice are probably not warranted in commercial practice.
2502. FUDGE, B. R. 634.3-1.8
The effect of applications of calcium and magnesium upon absorption of potassium by citrus.
Proc. Fla St. hort. Soc. 1946, pp. 46-51.
During the past 10 years the fertilizer mixtures applied to Florida citrus groves have changed from the old type N-P-K formula to those which have added calcium, magnesium and trace elements, the last named frequently being applied as nutritional sprays. The author points out some effects which the addition of calcium and magnesium has on the absorption of potassium.
2503. HAAS, A. R. C. 634.31-1.811.9
Growth stimulation in Valencia orange trees.
Calif. Citrogr., 1947, 32: 185, 198-9.
Although no claim is made regarding the essential nature of aluminium for health in citrus, considerable improvement has been obtained by the use of aluminium citrate in experimental solutions and soil cultures with budded nursery trees and with Valencia orange leafy-twig cuttings whip-grafted on Keen sour orange seedlings as rootstocks. The suggestion is made that minor elements other than those commonly used for citrus may be found to stimulate the production of healthy growth in citrus. [Author's summary.]
2504. STEWART, W. S., KLOTZ, L. J., AND HIELD, H. Z. 634.31-1.55: 577.17
Effects of plant growth regulators on orange fruit drop.
Calif. Citrogr., 1947, 32: 314-7.
Water sprays containing 2,4-D reduce preharvest fruit drop of Valencia and Washington Navel oranges. Reductions in fruit loss of 30 to 60% were obtained with sprays of 8 p.p.m., or less, of 2,4-D, while more concentrated sprays up to 25 p.p.m. reduced drop as much as 91%, with no apparent injury to mature leaves, though various degrees of distortion were observed on young, soft, expanding leaves. This may be avoided when using sprays of more than 8 p.p.m. of 2,4-D by spraying between growth flushes. Before these sprays can be recommended for commercial use it remains to determine possible residual injurious effects to the tree, as well as the best concentration and application time. No increase in fruit set or reduction in June-drop was obtained from 2,4-D sprays. [From authors' summary.]
2505. CAMP, A. F. 634.3-1.8
A résumé of feeding and spraying citrus trees from a nutritional viewpoint.
Proc. Fla St. hort. Soc. 1943, pp. 60-79, bibl. 30 [received 1947].
Although certain recommendations are made, this discussion in fertilizer and spraying problems is in the nature of a progress report.
2506. HARDING, P. L. 634.323-2.951
Effect of lead arsenate spray on the seasonal changes in Florida grapefruit.
Proc. Fla St. hort. Soc. 1945, pp. 161-9, bibl. 5.
One application of spray (at rate of 1 lb. lead arsenate to 100 gal. water) resulted in a significant reduction in total acid, higher ratios of total solids to total acid, earlier maturity, more palatable fruit and a slight decrease in weight and size of fruit.
2507. CROUS, P. A. 634.31-2.951
Reduction of acidity in Valencias.
Citrus Gr. 1947, No. 156, pp. 8-9.
A spray of 2 lb. lead arsenate in 100 gal. water, applied every third year in December or January to Valencias in South Africa, enables picking and packing to begin 2-4 weeks earlier than usual, and improves the flavour of the fruit without affecting its arsenic content at maturity.
2508. COURANJOU, A. 634.31-2.1
La cure de santé de nos orangeries. (Keeping our oranges healthy.)
Fruits et Prim., 1947, 17: 8-11.
An illustrated guide to the principal deficiency and other diseases of oranges in North Africa, with appropriate remedies. Faulty cultural practices described include excessive pruning and earthing up the trunk.
2509. MILLER, E. V. 634.3-2.4/6
Relationship between rind blemishes and juice quality of Florida oranges.
Proc. Fla St. hort. Soc. 1942, pp. 25-8, bibl. 3 [received 1947].
Juice quality is not seriously affected by rind blemishes caused by rust-mite and melanose—the main causes of blemishes on Florida citrus fruit.
2510. SCOTT, F. M., AND BAKER, K. C. 634.31-2.19
Anatomy of Washington Navel orange rind in relation to water spot.
Bot. Gaz., 1947, 108: 459-75, bibl. 42.
The epidermis of the Washington Navel orange is structurally weak and permeable to water; in the mature fruit, the critical balance between epidermal extension and increase in volume may be upset by excessive absorption of water during winter rains. The explanation of the susceptibility of the Washington Navel to water spot remains undetermined, as varieties with similar rinds are more resistant.—Univ. of Calif., Los Angeles.
2511. CALAVAN, E. C. 634.334-2.19
Shell bark of lemons.
Calif. Citrogr., 1947, 32: 232, 233, 264, 265, bibl. 7.
It is suggested that shell bark is physiogenetic. Its development is described and illustrated. Failure to control shell bark by the use of fungicides is due to the non-fungus nature of the primary lesions. The solution of the problem may be found through breeding and/or selection. [From author's summary.]
2512. ROY, W. R. 634.323-2.19: 546.27
Studies of boron deficiency in grapefruit.
Proc. Fla St. hort. Soc. 1943, pp. 38-43, bibl. 6 [received 1947].
The leaf and fruit symptoms of boron-deficient trees are

described and illustrated. Applications of large amounts of soluble arsenic to boron-sufficient trees resulted in symptoms characteristic of boron deficiency. [Arsenical sprays are commonly used in Florida to hasten maturity of grapefruit.] The influence of rootstock on the uptake of boron is pointed out.

2513. HAAS, A. R. C., AND ZENTMYER, G. A. 634.334-2.191

Treatments for chlorosis in lemon leaves.

Calif. Citrogr., 1946, 32: 48, 64-5.

An illustrated account of studies conducted with budded lemon trees growing in sand cultures. The treatments used included the application of Fermate and magnetite dusts, as well as sprays of various iron salts.

2514. SIMONNEAU, R., AND MAURI, N. 634.321-2.183

Observations sur les chutes de fruits dues à l'action des vents chauds sur le Clémentinier.

(Fruit fall of Clementines caused by hot winds.) *Fruits et Prim.*, 1946, 16: 167-9.

The authors observed fruitfall in two orchards in the Perrégaux district. Seven days after the siroccos of May and June, 1945, physiological fruit fall occurred in both orchards; this was more serious in the orchard that had been irrigated just before the sirocco began, and lighter in the other, irrigated at the end of the sirocco. Later winds from the north and north-west, but not of the sirocco type, caused mechanical fall immediately, followed by physiological fall continuing a week after the winds had ceased. It is suggested that further observations might point to the desirability of irrigating after each sirocco.

2515. HIBON, J. 634.3-2.112

A propos d'une défoliation des agrumes. (Defoliation of citrus.)

Fruits et Prim., 1946, 16: 206-7, bibl. 2.

The author suggests that the extensive defoliation of citrus in French Morocco in 1946 was due to drought caused by the formation of a hard pan. He recommends subsoiling followed by a soluble complete fertilizer applied with the next irrigation.

2516. LAWLESS, W. W. 634.3-2.111

Effect of freeze damage on citrus trees and fruit in relation to grove practices.

Proc. Fla. St. hort. Soc. 1941, pp. 67-74, bibl. 1 [received 1947].

The extent of cold damage is a reflection of the tree's condition which is determined by the proper or improper use of tree nutrients, including zinc, copper, manganese, and magnesium. The use of all four of these elements, in addition to nitrogen, phosphorus, and potassium, results in sufficiently vigorous tree growth to minimize the effects of low temperatures. [From author's conclusions.]

2517. FAWCETT, H. S., AND WALLACE, J. M. 634.3-2.8

Evidence of the virus nature of citrus "quick decline".

Calif. Citrogr., 1946, 32: 50, 88-9.

An important preliminary report, dated 14 November, 1946, in which it is concluded that quick decline is a virus disease.

2518. OLMO, H. P., AND MOREIRA, S. 634.3-2.8

Quick decline disease and tristeza.

Calif. Citrogr., 1947, 32: 138, 175-6, bibl. 12.

The symptoms, mode of attack and species affected indicate that tristeza of South America and quick decline of California are the same, or very similar, infections. If this is so, then all varieties of sweet orange, mandarin and grapefruit grafted on sour orange rootstocks might succumb, or be rendered worthless, within a few decades. The importance of the disease has already been recognized in California but there are millions of trees of susceptible combinations in Florida, Texas and the Mediterranean countries subject to

attack, where no attention has yet been focused on the seriousness of the problem. [From authors' summary.]

2519. DICKSON, R. C., AND JOHNSON, M. M. 634.3-2.8-2.6/7

Insect investigations in relation to quick decline.

Calif. Citrogr., 1947, 32: 159-62.

A popular account of entomological investigations undertaken in California.

2520. ANON. 634.31-2.19

The "Quick Decline" quarantine regulation.

Calif. Citrogr., 1947, 32: 206-8.

Quarantine Regulation No. 8 governing the movement of trees and propagative parts of the sweet orange in parts of California where quick decline of orange trees occurs.

2521. TERRA, G. J. A. 634.3-1.541.11-2.8

Citrus rootstock decline problem in Java.

Calif. Citrogr., 1947, 32: 444-6.

A short description of rootstock problems and the citrus decline situation in Java is given. Following observations made in California it is suggested that Java citrus has acquired some resistance, or tolerance, to one or more of the viruses suspected of causing quick decline. A condition possibly similar to citrus decline also occurs with persimmon in Java.

2522. SCHNEIDER, H. 634.3-2.8

Quick decline and tristeza.

Calif. Citrogr., 1947, 32: 448-50, bibl. 5.

These two diseases appear to be similar. "The developmental stages of the two diseases for sweet orange on sour orange stock appear to be approximately as follows: (1) introduction of the virus into sweet orange top which is at first symptomless; (2) growth and spread of the virus throughout the sweet orange which is tolerant to the virus; (3) movement of the virus, or a by-product of its synthesis or metabolism, down the branches and trunk by way of the sieve tubes to the sour stock; (4) poisoning and death of the sour orange sieve-tubes by the virus or its by-products; (5) utilization of the reserve foods in the sour orange stock (starch and fats) by the sour orange roots in their growth and respiration as a result of the cutting off of the normal supply; (6) after utilization of stored food the roots become weak or die and are subject to attack by saprophytic soil organisms; (7) because of this death of the sour orange sieve-tubes, subsequent loss of food and death of roots, the tree either collapses or declines gradually."

2523. H[ECTOR], J. M. 634.3-2.8

The inter-relatedness of "Quick Decline" and "Tristeza".

Citrus St. 1947, No. 158, pp. 1-3.

In a brief review of the literature the author suggests that South African "incompatibility", tristeza and quick decline of citrus may be identical, and due to a virus; that the virus was already present in South Africa when citrus planting developed there in the early years of this century and was carried there to South America about 1930, when trees were exported.

2524. STEVENS, H. E. 634.3-2.8

Some additional information on citrus psorosis.

Proc. Fla. St. hort. Soc. 1945, pp. 98-105, bibl. 4.

It is assumed that this virus disease is spread by infected budwood. There is little hope of finding a method for controlling or curing the disease where it is systemic, but if the source of budwood can be controlled, its spread to new plantings can be prevented.

2525. DE ALENCAR, J. 634.3-2.8

Sorose do citros. (Psorosis of citrus.)

Ceres, 1946, 7: 108-13.

An illustrated account of the symptoms of psorosis found in the State of Minas Gerais, chiefly on sweet orange and tangerine; mosaic is best seen on young leaves. The

author follows Fawcett (*H.A.*, 15: 792) in recommending control measures.—High School of Agriculture, Vicosá.

2526. BROOKS, C. 634.3-2.4
Prevention of stem-end rot [in citrus*fruit].
Proc. Fla. St. hort. Soc. 1942, pp. 61-9 [received 1947].

Borax is the most satisfactory disinfectant known for the control of stem-end rot and if ethylene is really necessary to secure a marketable colour, the borax treatment should precede the ethylene. [From author's summary.]

2527. HILDEBRAND, E. M. 634.3-2.4
Stem-end rot fungi attack immature citrus fruit.
Abstr. in *Phytopathology*, 1947, 37: 433.

All developmental stages of citrus fruits from shortly after the blossom phase until maturity are naturally inoculated and become infected, upon removal from the tree. The stem-end rot fungi involved in this infection are *Phomopsis citri* and *Diplodia natalensis*.

2528. MINZ, G. 643.31: 632.48
Diplodia natalensis, its occurrence on flowers, button and stem-end of Shamouti orange, and its relation to stem-end rot and fruit drop.
Bull. Rehovot agric. res. Stat. 42, 1946, 19 pp., and *Palestine J. Bot. (R)*, 1946, 5: 152-68, bibl. 24.

Diplodia natalensis was found on or in the stem end of Shamouti oranges as early as 2 weeks after fruit set (May). Its incidence was higher from November to April than from May to October; and was highest during March and April, towards the end of the picking season. It did not differ markedly on fruits from pruned and unpruned trees in the same grove. Flower infection is negligible. A list is given of 40 fungi that have been isolated from stem-ends and flowers of Shamouti oranges.

2529. KLOTZ, L. J., and ZENTMYER, G. A. 634.3-2.48
Fungicides for the control of brown rot of citrus.
Abstr. in *Phytopathology*, 1947, 37: 362.

No satisfactory substitute for copper sprays has yet been found. In laboratory experiments certain other materials have shown promise but in the grove they have failed to weather satisfactorily and to protect fruit from decay by the brown-rot fungi.

2530. WAGER, V. A. 634.3-2.4
Preliminary investigations on the black spot disease of citrus [*Phoma citricarpa*].
Citrus Gr. 1946, No. 151, p. 7.

This disease [*H.A.*, 16: 1035] can be controlled by spraying full strength bordeaux mixture (4-4-50) at petal drop and 6 and 12 weeks later; but the trees are injured and the fruits colour slowly and are of poor quality. Scale insects multiplied on sprayed trees. Other sprays are being tested. Cold storage inhibits the development of new spots only during storage.

2531. SWART, H. C. 634.3-2.7
The control of citrus insect pests in the Western Transvaal.
Citrus Gr. 1946, No. 147, pp. 9-12.

Scale insects.—Co-operative fumigation with HCN is preferred, as being more effective against insects and less damaging to fruit and trees than the alternative, a 2% oil emulsion spray. *False codling moth*.—Infested fruits should be removed from the trees and dropped fruits collected and destroyed by burying or submersion. *Fruit flies*.—A bait of 1-1½ oz. sodium fluosilicate, 2 lb. white sugar, 4 gal. water, should be applied at the rate of 12 fluid oz. per tree; fruit should be destroyed as for false codling moth control. *Citrus thrips*.—At the end of petal fall trees should be sprayed with 2 lb. Tarto, 2 lb. sugar, 100 gal. water at 2 gal. per tree. If rainfall is heavy in the three days after spraying, or if thrips build up later, a second spraying may be needed. *Mealy bugs*.—Biological control. *Aphids*.—

2% nicotine dust, or 40% nicotine sulphate sprayed at a dilution 1: 600. *American bollworm*.—Heavy infestations should be controlled with sprays or dusts of cryolite or sodium fluosilicate, but only under expert guidance.

2532. JEPSON, L. R. 634.3-2.654.2
Field studies with new chemicals for control of citrus mites.
Calif. Citrogr., 1947, 32: 331.

Most of the new acaricides referred to are not yet on the market.

2533. MYBURGH, A. C. 634.3-2.752
Some preliminary tests with "Gammexane" [666] as a control measure for red scale on citrus. I. "Gammexane" smokes. II. Oil sprays containing "Gammexane".
Citrus Gr. 1946, No. 155, p. 7, and 1947, No. 156, p. 7.

Smoke.—Many crawlers continue to die for several days after smoking under canvas, but where the density of particles deposited was less than 300-400 per sq. mm. many survived. *Sprays*.—The addition of Gammexane to the oil phase of Albolem white oil emulsion improved its performance slightly, but not economically.

2534. ANON. 634.31-2.752
The bronze orange bug (*Rhoecocoris sulciventris*).
Agric. Gaz. N.S.W., 1947, 58: 197-9.

In various parts of the north coast of New South Wales the bronze orange bug sometimes becomes a serious pest in citrus orchards, damaging the tender growth and causing the young shoots to wilt and die back. The flowers and fruit stalks also may be attacked and the crop lost. In their younger stages the bugs may be controlled with (a) resin-soda spray—resin 10 lb., caustic soda 3 lb., fish oil 1½ lb., water 40 gal., (b) soft soap spray—soft soap 10 lb., water 40 gal., or (c) white oil-nicotine spray—white oil emulsion ½ gal., nicotine sulphate ½ pt., water 40 gal. When the bugs have become active in the spring and have entered their third, fourth or later stages of development the sprays above mentioned are ineffective. DDT emulsions, though somewhat slow in action, have been found to be very effective, and give good results, even against adult bugs, at concentrations containing 0.1% DDT.

2535. WHITE, F. A. 634.3-2.754
Notes on citrus nematodes.
Calif. Citrogr., 1947, 32: 312-13.

A summary of information on a subject which is now regarded as of major importance to California citrus growers.

2536. PERRET, J. E. 632.76: 634.3
Cétonides et fruits d'agrumes dans les plantations de Marrakech. (Cetonides and citrus fruit in the Marrakech orchards).
Fruits et Prim., 1946, 16: 318-24, bibl. 8.

The cetonides, *Oxythya pantherina* Gory and *O. funesta* Poda, visit citrus flowers to collect nectar; but near Marrakech they frequently damage the ovary so severely as to cause the fruit to fall or to become so scarred that it is not fit for export. The damage is very like that caused by thrips or by chafing of fruit by twigs. No workable control measure has been evolved; an intercrops flowering at the same period, and attractive to the beetles, should be sought.

2537. WINSTON, J. R. 634.31-2.95
Degreening of oranges as affected by oil sprays.
Proc. Fla. St. hort. Soc. 1942, pp. 42-5 [received 1947].

Oil sprays have the effect of impeding the development of colour in the rind of oranges not only on the tree but also in the colouring room. [From author's summary.]

2538. REDD, J. B. 634.3-2.951.8
Oil deposits from commercial oil emulsions.
Proc. Fla. St. hort. Soc. 1945, pp. 108-16, bibl. 7.

Oil sprays are noted for their inconsistent control of scale

insects. Investigations showed that it is the oil deposit that kills the scale and that this varies with different emulsions and different spraying conditions. In general it takes 50 micrograms of oil per sq. cm. to kill scale insects and doses of over 90 micrograms harm the tree. Considerable care and experience are necessary for the successful use of any oil spray. If a diluted emulsion is broken before it can be used it should be discarded. Mechanical sprayers should be driven slowly. Trees on which oil spray has dried should not be re-sprayed with oil.

2539. MOWRY, H. 633/635(75.9)
Research in horticulture during the past year by the
Florida Agricultural Experiment Station.
Proc. Fla. St. hort. Soc. 1945, pp. 133-5.

Vegetables.—Dithane-zinc sulphate-lime spray applied to potatoes in southern Florida was claimed to be highly successful in controlling blights. Several selected strains of tomatoes proved immune to *Fusarium* wilt in the field. *Tung*.—Research emphasized the need for zinc on all soils where tung is grown, the need for minor elements on sandy soils, the importance of potash and the value of cover crops in tung culture. *Citrus*.—Improvement was made in the process of concentrating citrus juice by freezing. Brief reference is made to "Spreading Decline" disease, irrigation experiments, physiological studies and spraying trials.

2540. GARDNER, F. E., AND PIPER, R. B. 631.535: 634.1/7: 551.566.1
Ease of propagation of some sub-tropical fruits by
cuttings from young seedlings.
Proc. Fla. St. hort. Soc. 1943, pp. 124-6, bibl. 2,
6 photographs [received 1947].

Seedling-cuttings of papaya, lychee, mango, sweet orange and grapefruit were successfully rooted in sand under glass. The results are discussed. The main interest of the results lies in the fact that a high proportion of these cuttings rooted whereas cuttings taken from older or mature plants of the same species usually resist all attempts to propagate them by this means. There is a fundamental problem here, the solution of which may prove of great value in plant propagation.

2541. COOPER, W. C., AND FURR, J. R. 631.541: 634.1/8: 551.566.1
The cinchona veneer-graft method of propagating
subtropical fruit trees.
Proc. Fla. St. hort. Soc. 1945, pp. 176-80, bibl. 2.

This method was used successfully for grafting avocado, mango, orange, jaboticaba, loquat and white sapote. Eleven photographs illustrate the method used.

2542. NUSBAUM, C. J. 633.492-2.19: 546.27
Studies of boron deficiency in sweet potatoes.
Abstr. in Phytopathology, 1947, 37: 435.

Without adding borax, B-deficiency was severe with low P, standard, and high N fertilizers and was slight with low N, low K and low PK. Lime tended to increase B-deficiency. An application of 5 lb. borax per acre practically eliminated B-deficiency symptoms. Growth cracking was most severe with low P and high N fertilizers. The highest yields and returns were obtained from the standard (3-9-9) fertilizer plus borax.

2543. NUSBAUM, C. J. 633.492-2.8
Studies of internal cork, a probable virus disease
of sweet potato.
Abstr. in Phytoetatology, 1947, 37: 435.

Internal cork of sweet potato appears to be caused by a pathogenic virus. It is constantly associated with leaf symptoms indicative of virus infection. Infected roots carry the disease through storage and produce it in a succeeding crop grown from them. Although the disease affects the foliage, no noticeable reduction of yield has been noted.

2544. BLACKMON, G. H. 633.85(759)
Tung oil production in Florida.
Proc. Fla. St. hort. Soc. 1945, pp. 136-43.

Deals mainly with the development and distribution of the tung industry, planting, fertilizing, cover-crops, harvesting and processing.

2545. WEBSTER, C. C. 633.85
Notes on some clones of budded tung (*Aleurites montana*).
Nyasaland agric. quart. J., 1946, 6: 73-9.

Descriptions are given of 13 selected tung clones now in their first yield trials. The programme of selection and vegetative propagation did not begin until 1940 so that it is too soon to assess the value of the various clones under trial.

2546. SARAGOV, N. I. 633.85
The search for complete substitutes for tung oil.
[Russian.]
Sovetsk. Bot., 1946, 14: 335-8.

A search is being made for herbaceous plants, preferably annual, which will yield oil comparable in quality to tung oil. The following species are believed to be promising, and practical information concerning the plants and the properties of their oils is briefly set forth: *Eschscholtzia patrinii* Gercke (E. Willd.), *Salvia sclarea* L., *Euphorbia palustris* L., and *Euphorbia virgata* W.K. It is expected that the *Euphorbiaceae* will yield the largest number of useful species.

2547. BONIFACIO, G. 634.462: 581.162.3
La biologia florale del carrubo e la possibilità
di perfezionamenti genetici. (Carob flowers
and the possibility of genetical perfection.)
Riv. Frutticoltura, 1942, 6: 51-3 [received 1947].

The author raised some 50 carob plants from seed taken from particularly good fruits and observed that of the seedlings some were male, some female and others hermaphrodite. Certain of the last, moreover, produced quite tolerably good fruit. It is suggested that breeding and selection might lead to the elimination of pollination difficulties, which in the past in Italy have always been considerable.

2548. DICKEY, R. D. 634.61-2.19: 546.711
A manganese deficiency of palms and some other
ornamental trees in Florida.
Proc. Southern Shade Tree Conf., 1945, pp. 98-
103, bibl. 8.

The symptoms of manganese deficiency of the plummy coconut palm are chlorosis, interveinal at first, followed by necrosis and reduction in size of leaves, which become distorted; eventually the palm dies. Manganese deficiency also affects the Canary Island date palm, *Lagerstroemia indica*, camphor and citrus, in parts of Florida.

2549. CIFERRI, R., AND REDAELLI, P. 634.62-2.4
Segnalazione dello *Sporendonema epizoum* (Cda)
Cif. et Red. su frutti di dattero in Libia. (*Sporendonema epizoum* on dates in Libya.)
Reprint from *Mycopathologia*, 1940, 2: 162-3
[received 1947].

Sporendonema epizoum, the synonymy of which is reviewed, has been found on dates imported into Florence from Libya, forming spots 1 to 1.5 mm. (rarely 2 mm.) in diameter, pulvinate, hemispherical, brown and somewhat velvety, isolated or rarely confluent. The spots were not numerous and occurred only on some of the fruits examined, but in view of the wide distribution of the fungus it must be looked upon as a possible agent of mycosis in northern Africa.

2550. BLISS, D. E. 634.62-2.4
Controlling fruit spoilage in dates.
Abstr. in *Phytopathology*, 1947, 37: 360.
Moist weather during August and September is conducive to fungus spoilage of dates by *Aspergillus niger*, *Alternaria citri*, etc., and to insect infestation. A Fermate sulphur mixture (5% Fermate in sulphur) has given promising control in field trials without any reduction of fruit quality or palatability.
2551. SIMONNEAU, P. 634.64(61)
La culture du grenadier à Saint-Denis du Sig.
(Growing pomegranates at Saint-Denis du Sig.)
Fruits et Prim., 1947, 17: 52-4.
Of the Spanish varieties of pomegranate now grown in North Africa, the author would base selection upon Dulce colorada and Granada blanca. So far American and Russian varieties have not been tested.
2552. FAIRCHILD, D. 634.653
Two relatives of the avocado and their reintroduction into Florida.
Proc. Fla. St. hort. Soc. 1945, pp. 170-5.
The species referred to are *Persea schiendiana* and *Hufelandia anay* which the author suggests might be used in avocado breeding with the object of creating new hybrid forms.
2553. BURGIS, D. S., AND WOLFE, H. S. 634.653: 581.144.2
Do avocado roots develop root-hairs?
Proc. Fla. St. hort. Soc. 1945, pp. 197-8.
A report on a series of tests in which no root-hairs were found.
2554. FRANCE, J. G. 634.653-1.542
Practical printers in avocado pruning.
Calif. Citrogr., 1947, 32: 506-8.
The author refers to the neglect of pruning in many Californian avocado orchards and stresses the importance of judicious pruning in the early life of an orchard. Hints are given on pruning, based on practical considerations: there appear to be no experimental data on the subject.
2555. ELAZARI-VOLCANI, Z. 634.653-2.48
Bacterial rot of avocado fruit.
Palestine J. Bot. (R), 1946, 5: 169-80, bibl. 9.
A dry rot of unripe fruits is described. The symptoms are a dry, greenish, dark rot starting at the distal end of the fruit and spreading over one side, covering about one-third of its size. Histological, cultural and inoculation tests showed that the disease is caused by an organism corresponding very closely with *Pseudomonas syringae*.
2556. ZENTMYER, G. A., AND KLOTZ, L. J. 634.653-2.4
The role of micro-organisms in avocado tree decline.
Abstr. in *Phytopathology*, 1947, 37: 366.
Two factors appear to be involved in decline, namely waterlogging and *Phytophthora cinnamomi*. Toxic products formed by bacteria and other micro-organisms under anaerobic conditions, including butyric acid, nitrite, and H_2S , also play a part in decline.
2557. a BRIAND, M. 634.3(64)
Culture des agrumes. (Citrus growing [in Morocco].)
Fruits et Prim., 1946, 16: 200-6.
b DENIS, G. 634.62(677.1)
Conseils pratiques pour la culture du dattier en Côte Française des Somalis. (Practical advice on growing dates in French Somaliland.)
Fruits d'Outre-Mer, 1947, 2: 102-6.
- c FURR, J. R., REECE, P. C., AND GARDNER, F. E. 634.653-2.19
Symptoms exhibited by avocado trees grown in outdoor sand cultures deprived of various mineral nutrients.
Proc. Fla. St. hort. Soc. 1946, pp. 138-45, bibl. 6, 19 photographs.
- d LAWLESS, W. W. 634.3(94)
Some observations on the citrus industry of Australia.
Proc. Fla. St. hort. Soc. 1945, pp. 36-44.
- e LEROY, J. 634.3-1.55
La cueillette des agrumes. (Harvesting citrus.)
Fruits et Prim., 1946, 16: 325-30.
A guide for North Africa.
- f LYNCH, S. J., MUSTARD, M. J., AND SLATER, G. 634.651-1.83
The effect of potash upon the yield of papaya fruit and upon some of its chemical constituents.
Proc. Fla. St. hort. Soc. 1943, pp. 115-22, bibl. 8 [received 1947].
- g MENDES, P. T. 633.85(82)
A cultura do tungue na República Argentina. (The cultivation of tung in the Argentine.)
Rev. Agric. São Paulo, 1947, 22: 181-8.
- h MILLER, E. V., AND WINSTON, J. R. 634.3
Juice colour and quality in certain varieties of Florida citrus fruits.
Proc. Fla. St. hort. Soc. 1941, pp. 64-7 [received 1947].
- i MILLER, E. V., AND WINSTON, J. R. 634.31-2.19
Green-spotting [Oleocellosis] in relation to time of day that early oranges are harvested.
Proc. Fla. St. hort. Soc. 1943, pp. 22-6 [received 1947].
- j SCHNEIDER, H. 634.31-2.8
Sieve-tube necrosis in orange trees affected by quick decline during the spring season.
Abstr. in *Phytopathology*, 1947, 37: 364.
- k STEARNS, C. R., AND YOUNG, G. T. 634.3: 581.175.11: 551.5
The relation of climatic conditions to colour development in citrus fruit.
Proc. Fla. St. hort. Soc. 1942, pp. 59-61 [received 1947].
- THOMPSON, W. L. 634.3-2.752
Some problems of control of scale insects on citrus.
Proc. Fla. St. hort. Soc. 1942, pp. 51-9, bibl. 2 [received 1947].
- m THOMPSON, W. L., AND SITES, J. W. 634.3: 632.951
Relationship of solids and ratio to the timing of oil sprays on citrus.
Proc. Fla. St. hort. Soc. 1945, pp. 116-23, bibl. 3.
- n THOMPSON, W. L. 634.3-2.654.2
Preventive sprays for mite control on citrus.
Proc. Fla. St. hort. Soc. 1946, pp. 61-5, bibl. 4.
- o VILARDEBO, A. 634.3-2.752
Aperçu sommaire des moyens de lutte contre les cochenilles des aurantiacées. (Review of methods of controlling citrus scales.)
Fruits d'Outre-Mer, 1947, 2: 46-51, bibl. 8.
- p VOORHEES, R. K. 634.3-2.952
A comparison of some copper fungicides in controlling citrus melanose.
Proc. Fla. St. hort. Soc. 1943, pp. 49-55, bibl. 1 [received 1947].

TROPICAL CROPS*

2558. TOXOPEUS, H. J. 631.52: 633.832
 Botanisch onderzoek ten behoeve van de
 plantenveredeling. (The application of botanical
 research to plant improvement.)
Landbouwk. Tijdschr., 1947, 59: 328-36, bibl. 17.
 This paper outlines the co-operative approach to plant
 breeding, making use of systematist, collector, cytologist,
 geneticist and physiologist, particularly as applied to
 tropical crops. Examples given include work on *Derris*
 and work in progress on cloves, *Eugenia aromatica*. In
 parts of Java and Sumatra cloves are subject to diseases
 possibly identical with "sudden death" in Zanzibar.
 Wild forms may be useful as rootstocks and for breeding.—
 Buitenzorg.
2559. VANDENPLAS, A. 551.52(675)
*La température au Congo Belge. (Temperatures
 in the Belgian Congo.)*
 Ministère des Colonies, Direction de l'Agriculture,
 1947, pp. 194, 50 francs.
 An outline of the division and main characters of tempera-
 ture distribution in the Belgian Congo: a sequence to the
 study of rainfall which appeared in 1943 (*Bull. Agric.
 Congo belge* 34 (Bruxelles), fasc. 3-4).
2560. ANON. 633/635(595): 355.01
 Central Experiment Station, Serdang [Malaya]:
 conditions during and after enemy occupation.
Malay. agric. J., 1947, 30: 64-71.
 Includes a list showing some of the crops lost during the
 Japanese occupation.
2561. LEVER, R. J. A. W. 632.6/7: 633/635(916.1)
Insect pests in Fiji.
Bull. Fiji Dep. Agric. 23, 1946, 36 pp.
 This bulletin consists of five parts, viz. 1. Classification,
 elementary anatomy, and life histories of insects. 2. Chief
 insect pests of various classified crops. 3. Pests other than
 crop pests. 4. Beneficial insects and biological control of
 insects and weeds. 5. Measures for controlling insects.
 It is illustrated by five pages of drawings, a map of Fiji,
 and a graph showing the average temperature, rainfall and
 relative humidity of a wet zone (Suva) and dry zone station
 (Lautoka). Part 2 includes notes on pests of a number of
 tropical fruits (banana, *Citrus* spp., guava, pineapple, etc.)
 and of garden vegetables. Appendix 1 is a list of chief
 insect pests and the crops attacked. With regard to guava
 (*Psidium guajava*) it is stated that "this tree occupies an
 interesting position in the Colony as, although of use as a
 fruit and its trunk for firewood, it is one of our worst
 noxious weeds, especially in land not under cultivation".
2562. LEVER, R. J. A. W. 632.6/7: 633/635(916.1)
Insect pests of some economic crops in Fiji. No. 2.
Bull. ent. Res., 1947, 38: 137-43.
 As in Part 1 (*ibid.*, 1945, 35: 367-77; *H.A.*, 16: 1061), a
 considerable proportion of the alphabetically listed crops
 are horticultural and plantation crops. There are also
 some corrections to the first list.
2563. CHOPRA, R. N., AND OTHERS. 632.951: 615.779.1
Pyrethrum cultivation in Kashmir.
Indian Fmg., 1947, 8: 78-82.
 The area under the crop in 1945-46 was 2,100 acres and is
 to be increased to 8,000. The acreage outside Kashmir in
 British India is less than 2,000. In the Nilgiri Hills, Assam
 and Mayurbhanj State the area is increasing. The seed
 used in Kashmir is apparently derived from the descendants
 of a small consignment obtained from Vilmorin, Paris, in
 1934-35. The optimum elevation for the crop in Kashmir
 is given as 6,000 ft. and the range as 5,000 to 8,000 ft. a.s.l.
 * See also 1926, 2067, 2087, 2088, 2251, 2252, 2294, 2296,
 2297, 2320, 2541, 2805.
- Dryers are not used; instead the flowers are sun-dried for
 three days and then shade-dried. Their moisture content
 is 8-9%. Figures quoted show that the pyrethrin content
 of flowers from 13 plantations varied from 0.75% to 1.02%.
 It is concluded that the pyrethrum industry appears to have a
 promising future in Kashmir.
2564. NATTRASS, R. M. 632.951: 615.779.1
A disease of pyrethrum in Kenya.
Nature, 1947, 160: 120-1, bibl. 3.
 Pyrethrum production in Kenya has risen from about
 1,900 tons in 1938 to 7,400 tons from some 53,000 acres in
 1945. Most of the crop is grown at an altitude of 6,000 and
 9,000 ft. While no disease occurred before 1946, severe
 losses, amounting to 80% in some instances, were caused
 in that year by the fungus *Ramularia bellunensis*, which
 prevents the flower buds from developing. The disease
 affects buds and flowers and rarely extends beyond the
 apical inch of the flower stalk. The foliage was rarely
 found infected. Only the Nanyuki area on the slopes of
 Mount Kenya was reported free of the disease at the time
 of writing.
2565. TILEMANS, E. 632.951
 Les légumineuses insecticides. (Leguminous
 sources of insecticides.)
Bull. agric. Congo belge (Bruxelles), 1941, 32:
 126-93, bibl. 303 [received 1947].
 A full account of the cultivation of *Derris*, *Lonchocarpus*,
Tephrosia and *Mundulea* species. Chemical and colori-
 metric methods for the estimation of rotenone, and the
 applications of this insecticide, are discussed at length.
2566. TONDEUR, R. 632.951
 Variations de la teneur en principes actifs du
 derris suivant l'âge et le diamètre de ses racines.
 (Variations in the amount of active principles in
 derris according to age and diameter of roots.)
Bull. agric. Congo belge, 1947, 38: 649-53,
 bibl. 3.
 The results from this study do not allow a conclusion to be
 drawn as to the ideal age at which derris-root should be
 dug. Further studies are suggested.
2567. EVANS, H. 632.954(698.2)
 Weed-control investigations [in Mauritius].
 17th A.R. Sugarcane Res. Stat. Mauritius 1947,
 pp. 25-51.
 Mauritius weeds are classified as bad, moderately bad and
 relatively harmless. Twenty-one are put in the first category
 and 85 in the second. Notes are given on the results
 obtained with various herbicides. An appreciable number
 of bad and moderately bad weeds belong to the *Gramineae*
 and *Cyperaceae* and so cannot be successfully controlled
 by the hormone-type of weed-killer. They are also highly
 resistant to DNOC and copper chloride, but susceptible
 to large doses of sodium chlorate. Other herbicides are
 to be tested.
2568. EVANS, H. 632.954(698.2)
 Chemical weed control.
Rev. agric. Maurice, 1947, 26: 108-24.
 A report of a lecture reviewing the history of chemical
 weed-killers and the results obtained in Mauritius from
 trials of modern herbicides. There is a forecast of probable
 future developments.
2569. HARRISON, A. L. 632.954
 2,4-D for the control of nut grass.
Proc. Fla. St. hort. Soc. 1946, pp. 78-81, bibl. 81.
 The results indicate that 2,4-D is a promising herbicide for
 use against nut grass in cultivated fields. The herbicide
 Ammate also showed promise.

2570. KIST, J. M., AND FRIEDERICH, J. C.

633.526.23/24(92)

De cultuur van enkele bast- en bladvezelleverende gewassen. (The cultivation of some fibre plants [in the Netherlands East Indies].)

Landbouwk. Tijdschr., 1947, 59: 337-45.

The perennial crops described are sisal (*Agave sisalana*) and cantala (*A. cantala*); these grow best on light to fairly heavy soil. Young plants, about 0.5 to 0.6 m. high, derived from bulbils or else from root suckers, are transplanted during the rains. They are set out 0.74 m. apart in double rows separated by 0.90 m.; pairs of rows are separated by 2.43 m., making a stand of 8,100 per ha. *Manuring*.—Calcium and organic matter are most important, and when these are adequately supplied phosphate and nitrogen are beneficial. Leguminous plants are generally grown between the rows, and on coarse-grained soils deep-rooted plants are also grown, being worked into the soil after 1½ to 2 years. Mill effluent, rich in organic matter, is also applied as liquid manure. *Harvesting*.—Two or three years after planting, all leaves at more than 45° to the vertical are cut by hand; on well-manured soils two crops may be harvested annually. Modern factories dispense with sun drying, and some are equipped for the recovery of fibres too short for spinning. *Breeding*.—By pruning roots and inflorescence it is possible to produce seed. Reciprocal crosses have been made, and both have been back-crossed with *A. sisal*. *A. amaniensis* is also under observation.

2571. PACILLY, B.

633.526.23(61)

La production du sisal dans les pays africains de l'Union Française. (Sisal production in French Africa.)

Agron. trop., 1947, 2: 3-35, bibl. 57.

So far, yields have been lower than those reported from East Africa.

2572. MAGEE, C. J.

633.524.3+634.6

Population and agriculture of South-East Asia.

J. Aust. Inst. agric. Sci., 1947, 13: 28-33.

This paper includes short descriptions of the manila hemp and oil palm industries. The hemp acreage has been greatly reduced recently by an outbreak of bunchy top, a virus disease. [May we very gently question the statement on p. 31 that palm kernel oil is used as a source of vitamin A ?]

2573. MARSH, T. D.

*633.526.1

Manila hemp (*Musa textilis*).

Malay. agric. J., 1947, 30: 123-9, bibl. 2.

A short description of manila hemp is followed by notes on its cultivation and methods of preparation. This crop is still in the experimental stage in Malaya. An Imperial Institute report on fibre samples from three introduced varieties grown in Malaya is quoted. The samples compared favourably with commercial grades.

2574. ANON.

633.72-1.521

Japanese develop a new tea.

Plant. Chron., 1947, 42: 82.

Japanese horticulturists are said to have developed a new tea called North of the Bamboo Thicket which is vastly superior to other green teas. It will be 10-13 years before the new tea can be exported.

2575. MARSH-SMITH, E. C.

633.72-1.535.7

Vegetative reproduction.

Tea Quart., 1947, 18: 107-11.

A description of a method for propagating tea from single internode leaf-cuttings, with advice on the procedure to be followed in choosing parent material.

2576. TUBBS, F. R.

633.72-1.5

The effect of cultivation on the growth of young tea.

Emp. J. exp. Agric., 1947, 15: 160-6, bibl. 4.

The effect of trenching, holing, and "envelope" forking prior to planting upon the growth, establishment, and root-distribution of young tea in Ceylon is described. The effects of differences in degree of cultivation upon the state of consolidation of the soil persisted for 8 years. No effects upon growth in size of stems or roots or upon establishment were found. Differences in the distribution of roots with depth occurred and are ascribed to the effect of local differences in fertility rather than to the stale, over-all consolidation of the soil. Natural terracing of the soil was associated with a parallel "terracing" of the root-systems. [Author's summary.]

2577. HARRISON, C. J.

633.72+663.63

Purification of tea estate water supplies.

Memo. Ind. Tea Ass., Tocklai Exp. Stat. 18, 1947, pp. 10.

Contains a description of the silver process for sterilizing water, successfully used during the war, and applicable, it is thought, to many tea estates in N.E. India. Silver-sterilization has the merit that it imparts no unpleasant taste to water. Clear water treated with silver in the proportion of 1 part silver to 100 million parts of water is rendered free from pathogenic bacteria, except those which are in the spore or encysted forms. The silver is introduced either in the form of a soluble silver salt, such as silver nitrate, or by passing an electric current between silver plates suspended in the supply.

2578. TUBBS, F. R.

633.72-1.542

Pruning today.

Tea Quart., 1947, 18: 112-14.

A plea for lighter, though not necessarily higher, pruning than is at present common on up-country tea estates in Ceylon.

2579. EDEN, T.

633.72-1.8-2.5

Manurial responses of tea and weeds.

Tea Quart., 1947, 18: 5-9.

A review and discussion of past results from manurial experiments in Ceylon.

2580. ANON.

633.72-2.4

Blister-blight of tea.

Plant. Chron., 1947, 42: 49-50.

"... South India is now faced with what is potentially the most serious disease ever to occur. Adjustment of time of pruning is likely to be of fundamental importance in the prevention and control of blister-blight ... as much tea as possible should be as far as possible from pruning at the time when the incidence of the blight may be assumed to recommence in full vigour."

2581. GADD, C. H.

633.72-2.4

Blister-blight affects Ceylon tea.

Plant. Chron., 1947, 42: 50-1, quoting from Times of Ceylon.

A note on the arrival of this disease in Ceylon in October 1946, with suggestions for controlling its spread.

2582. MANNING, J. D.

633.72-2.4

Blister blight situation April and May 1947.

Plant. Chron., 1947, 42: 295-8.

A summary of reports from nine districts in S. India, with a note on the success or failure of control measures.

2583. MAYNE, W. W.

633.72-2.4

Blister blight in the High Range [South India].

An address given before the 62nd Annual General Meeting of the Kanan Devan Planters' Association on 24.5.47.

Plant. Chron., 1947, 42: 314-17.

An analysis of the blister blight problem and a review of experience with the disease during the previous 6 months. Outbreaks of the blight are closely related to periods of rainfall. The complete elimination of the disease from South India is unlikely.

2584. TUBBS, F. R. 633.72-2.4
Blister blight, and a discussion.
Tea Quart., 1947, 18: 9-13.
A paper read 4 months after the first report of the disease in Ceylon. A report of the subsequent discussion is given.
2585. TUBBS, F. R. 633.72-2.4
Blister blight.
Tea Quart., 1947, 18: 23-6.
A lecture, delivered 7 months after the disease was first reported in Ceylon. The measures to be adopted, pending the evolution of a settled policy, are considered.
2586. CHEVALIER, A. 633.73
L'avenir de la culture des caféiers et de la production d'un café colonial dans les colonies françaises. (The future of coffee culture and a French colonial coffee.)
C.R. Acad. Agric. Fr., 1940, 26: 275-90 [received 1947].
A plan for a more intensive exploitation of the coffee industry in the French colonies.
2587. THOROLD, C. A. 633.73
A study of yields, preparation out-turns and quality in Arabica coffee. Pt. II.* Preparation, out-turns and quality.
Emp. J. exp. Agric., 1947, 15: 167-76, bibl. 3.
The study of preparation out-turns has revealed that the cherry/parchment and cherry/clean ratios and percentage hulling loss vary greatly in different seasons and during the same season for individual trees. Accurate factors for converting "cherry" weights to "parchment" or "clean" are not practicable; therefore such conversions should be carried out by the use of simple and arbitrary factors. The procedure for obtaining the "A grade" samples is described, together with the determination of other quality factors. Samples have been submitted to a liquorer who awarded marks for appearance of the "raw" and "roast". It was found that coffee which was stored carefully had not deteriorated after several years with respect to appearance of the "roast". This is not the case with clean coffee judged as "raw". The better "roasts", with which seemed to be correlated a low number of beans to 1 oz., were given by trees grown with natural shade. The produce of a tree representing the type which is resistant to Elgon dieback disease is not apparently inferior to the generality of coffee types. [Author's summary.]
2588. STOFFELS, E. H. J. 633.73(675)-1.55
L'improductivité des caféiers Arabica dans le Kivu Nord. (The poor yield of Arabica coffee in northern Kivu.)
Bull. agric. Congo belge (Bruxelles), 1941, 32: 59-69, bibl. 5 [received 1947].
The main causes are lack of light (partly due to the climate, partly to the bushy growth of the coffee), and attack by *Antestia* and *Lygus*. Multiple stem pruning should improve photosynthesis, and the bushes should be sprayed regularly with pyrethrum.
2589. HACQUART, A. 633.73: 581.145.1
Périodicité de la floraison et de la fructification du caféier "Robusta" à l'Equateur. (The periodicity of flowering and fruiting of Robusta coffee at the equator.)
Bull. agric. Congo belge (Bruxelles), 1941, 32: 496-538, bibl. 5 [received 1946].
This study is based on reports from two plantations, having in common a rainfall distribution showing two unequal maxima. The rhythm of flowering and fruiting is directly related to the rainfall peaks; flowering occurs at the end of each rainy period, and the crop ripens 10-11 months later. The author suggests that the trees should be pruned
- * For Part I see *H.A.*, 17: 1710.
- immediately after each flowering peak, before the differentiation of the next flower buds.
2590. DE SCHLIPPE, P. 633.73-1.542
Contribution au problème de la taille du caféier Robusta, à la lumière de la théorie de la sécheresse physiologique. (A contribution to the problem of pruning Robusta coffee, in the light of the theory of physiological drought.)
Bull. agric. Congo belge, 1947, 38: 315-46, bibl. 3.
The author's views are put forward after 16 years as a planter, with neither facilities nor time for their experimental verification. The main thesis is that the physiological age of a plant depends on the concentration of its sap, which is influenced by ecological factors and internal factors. To some extent both may be influenced by the planter, by shading and pruning. In a uniform climate the plant has time to adjust its natural ceiling of growth for optimum production, and pruning is unnecessary; where a fluctuating climate prevents this, appropriate pruning can assist the plant to reach a satisfactory equilibrium. Finally the author gives a table showing the pruning systems he recommends for (a) flat and (b) hilly land in "uniformly wet, uniformly dry, or heterogeneous climates.
2591. POSKIN, J. H. 633.73-1.541
Schéma d'ouverture de plantations clonales en caféiers Robusta. (Scheme for making clonal plantations of Robusta coffee.)
Bull. agric. Congo belge, 1947, 38: 347-50.
It is proposed to form clonal plantations of Robusta coffee by budding, on seedling stocks, with material furnished by I.N.E.A.C. It is assumed that 50% of the buds will take, and that each bud will produce eight new buds fit for use in 1½ years.
2592. FERWERDA, F. P. 633.73(92)
Enkele grepen uit het koffieveredelingswerk in Nederlandsch-Indië gedurende de laatste jaren voor den oorlog. (Some aspects of work on the improvement of coffee in the Netherlands East Indies during the years before the war.)
Landbouwk. Tijdschr., 1947, 59: 358-63, bibl. 21.
Part of this paper deals with plant breeding. Robusta clones must be planted in suitable combinations on account of their pronounced self-incompatibility. Rootstocks can now be propagated by cuttings either under glass or by etiolation; but comparative yield trials were war casualties. The morphology and development of buds taken from erect stems, horizontal branches, and erect side branches, have been studied; buds of the third type were being used successfully just before the war for top-working seedling plantations.
2593. T.V.P. 633.73(548)-2.76
Robusta improvement in South India—selection against shot-hole borer [*Xyleborus morstatti*].
Plant. Chron., 1947, 42: 41.
It is stated that there is a differential reaction to this insect amongst Robusta coffee plants. Figures are quoted which suggest that tolerance to it is an inherited character.
2594. MAMPRIM, O. A. 633.73-1.531
Tipo de semente para o cafeeiro. (Coffee seed for planting.)
Rev. Agric. São Paulo, 1947, 22: 109-18, bibl. 2.
Depulped coffee seed sown fresh gave significantly better germination than similar seed allowed to dry, parchment coffee, and cherry. "Shell" coffee (mature fruit dried in the shade) gave the lowest germination.
2595. PRATT, A. M. 633.73(729.2)
Coffee rehabilitation scheme.
Ext. Circ. Jamaica Dep. Agric. 1, 1946, pp. 3.
An outline of the scheme in so far as it concerns nurseries, central pulperies, experiment stations and advisory services.

2596. PRATT, A. M. 633.73(729.2)
Coffee rehabilitation scheme. Planting.
Ext. Circ. Jamaica Dep. Agric. 2, 1946, pp. 4.
Instructions for preparing land and planting coffee seedlings.
Illustrated.
2597. PRATT, A. M. 633.73(729.2)-1.542
Coffee rehabilitation scheme. Pruning. Short-top system, long-top system.
Ext. Circ. Jamaica Dep. Agric. 3, 1946, pp. 10.
The merits of these two methods are discussed, the short-top system being advocated for Jamaica. Illustrated instructions are given for carrying out both methods.
2598. GUISCAFRÉ-ARRILLAGA, J. 633.73: 631.8
Relación entre el sistema de raíces del café y el método para aplicar abonos. (The relation between the root system of coffee and the method of applying manures.)
Rev. Agric. Puerto Rico, 1946, 37: 141-4, bibl. 3.
The author's earlier studies on root distribution (*H.A.*, 10: 1453, 12: 245, and 13: 1013) lead him to recommend that manures be applied in a shallow circular trench just beyond the spread of the tree's branches.
2599. PEREIRA, H. C. 633.73-1.85
Phosphate fertilizers for Kenya coffee.
Mon. Bull. Coffee Bd Kenya, 1947, 12: 45.
A short general note, mainly on the suitability of Uganda rock phosphate for coffee. It is suggested that planters should apply moderate dressings of this phosphate incorporated in compost, or other organic matter, so as to protect it from rapid fixation by the iron and aluminium oxides in the soil.
2600. "LOWLANDER." 633.73
Some tentative suggestions for combating deterioration in the yield of coffee at the lower altitudes [of Kenya].
Mon. Bull. Coffee Bd Kenya, 1947, 12: 46-7.
Deals briefly with soil erosion, weeding, manuring, pruning and labour. A plea is made for the adoption of a middle course between the pernickety and the slapdash.
2601. (COFFEE SERVICES OFFICERS, KENYA.) 633.73-2.19
Yellowing symptoms of coffee.
Mon. Bull. Coffee Bd Kenya, 1947, 12: 82.
A note on yellowing in coffee which may be caused by exposure-damage, excessive crop, or nitrate deficiency. The treatments recommended are crop reduction and the application of ammonium sulphate.
2602. VENKATARAMAN, S. V. 633.73-2.4 + 2.6
Diseases of coffee.
Plant. Chron., 1947, 42: 62-6 and 83-88, reprinted from Mysore agric. J.
Short descriptions are given of some coffee diseases, with which are included nematodes and phanerogamic parasites.
2603. M[ANNING], W. W. 633.73(548)-2.4
Byways in the history of coffee diseases in India and Ceylon.
Plant. Chron., 1947, 42: 132-4, bibl. 5.
A historical note on some early references to two disease and pest problems which have attracted considerable attention in recent years. It is indicated "that in this case, the lengthening list of diseases and pests rests more on the increasing accuracy of diagnosis rather than on the appearance of really new afflictions".
2604. VAYSSIÈRE, P. 633.73(672)-2.75
La "couleure" des fleurs de caféier au Gabon. (Flower-drop of coffee in Gabon.)
C.R. Acad. Agric. Fr., 1940, 26: 793-8 [received 1947].
A flower-drop of coffee in Gabon (French Equatorial Africa) is associated with an attack by capsid bugs (*Volumnus obscurus*). In typical cases of attack their repeated punctures cause the petals to turn black and become detached from the disc, with or without the stamens, but they remain attached to the style which continues to grow. In other cases the perianth turns black but the style ceases to grow, while sometimes the ovary is punctured and blackens. The capsid also punctures the ovary after fertilization, arresting its development, the buds, the young leaves and even the young shoots. Other hosts for the pest are certain wild plants, particularly some which thrive in low damp places. Control measures should aim at attacking the pest not only on the coffee plant but also on the wild hosts. The lower, moist parts of the plantations should be drained. Pyrethrum powder mixed with wood ashes is recommended for dusting.
2605. MELVILLE, A. R. 633.73-2.73
A reminder on spraying for thrips.
Mon. Bull. Coffee Bd Kenya, 1947, 12: 21-2.
A repetition of earlier recommendations for using parigreen/molasses spray against coffee thrips.
2606. PEREIRA, H. C. 632.951: 633.73
DDT spray-banding for mealybug.
Mon. Bull. Coffee Bd Kenya, 1947, 12: 106.
A note on the danger of using power-kerosene as a solvent for DDT when preparing emulsions for spray-banding coffee. Only the best quality lighting paraffin (kerosene) should be used, otherwise complete ring-barking of the trees may result.
2607. DE BELLEFROID, V. 633.74-1.874
Etude sur les travaux d'enrichissement du sol à Lukolela. (Improving the soil at Lukolela.)
Bull. agric. Congo Belge (Bruxelles), 1941, 32: 539-53 [received 1946].
The application of compost made of cacao shells to mature cacao led to small and uneconomic estimated gains in yield.
2608. BOURIQUET, G. 633.821
Sur la germination des graines de vanillier. (*Vanilla planifolia* And.) (The germination of vanilla seeds.)
Agron. trop., 1947, 2: 150-64, bibl. 26.
The author's sterile medium was based on an extraction of all parts of the adult plant and the soil in which it grew, with glucose, gelatine and yeast. At 27° C. germination began in the third month, and some seedlings were still growing after 23 months; at 15 months adult roots had been added to the medium to allow mycorrhizal association. A single seedling that germinated naturally from a sowing made in 1937 at the base of a plant has grown vigorously and has fruited.
2609. CIBES, H. R., CHILDERS, N. F., AND LOUSTALOT, A. J. 633.821-2.19
Influence of mineral deficiencies on growth and composition of vanilla vines.
Plant. Physiol., 1947, 22: 291-9, bibl. 5.
Deficiency of N or K depressed the growth of vanilla cuttings; but deficiency of P produced poor growth and dying of tops and roots, symptoms resembling those produced by the so-called "root-rot" disease (ascribed to *Fusarium batatas* var. *vanillae*). Vines grew well in mulch irrigated with distilled water; the authors endorse the heavy mulching usually recommended for vanilla.—Mayaguez, Puerto Rico.
2610. ROLLER, J. W. 633.861
Gifts of the Americas. Annatto.
Agric. Amer., 1947, Vol. 7, No. 8/9, p. 3 of cover.
A note on the origin and history of this dye plant, *Bixa orellana*, its pigments, their extraction, sources of supply, uses and substitutes. Annatto is stated to contain 2% of vitamin A.
* For fuller and later report on these trials see *H.A.*, 17: 1715.

2611. (STATION EXPERIMENTALE DE QUINQUINA.) 633.88.51(661)
Le développement de la culture du quinquina en Afrique occidentale française. (The development of cinchona planting in French West Africa.) *La Nature*, 1er Mai, 1946, and CHAUVET, P.
L'A.O.F. produira-t-elle bientôt la quinine dont elle a besoin? (Can French West Africa soon produce the quinine it needs?) *France*, 7 Mars, 1947, in *Bull. agric. Congo belge*, 1947, 38: 427-8.
The Station, created in 1944, includes plantations at Sérédou, French Guinea, and Man, Ivory Coast. Development is in advance of the programme, that called for 250 ha. *Cinchona ledgeriana* and 90 ha. *C. succirubra* in 5 years. *Succirubra* has been affected by *Helopeltis*. Within 15 years an annual production of 15 metric tons of quinine extract is anticipated. France at present uses 10-15 tons a year, and general prophylaxis in French West Africa would need 20 tons annually.
2612. WINTERS, H. F., LOUSTALOT, A. J., and CHILDERS, N. F. 633.88.51
Influence of temperature on growth and alkaloid content of cinchona seedlings. *Plant Physiol.*, 1947, 22: 42-50, bibl. 4.
Seedlings of *Cinchona ledgeriana* and *C. pubescens* were grown for a year under four conditions, viz. (1) just simply in a greenhouse, and (2), (3) and (4) in insulated glass chambers with temperatures controlled to 70°-80° (night-day), 65°-75°, and 60°-70° F.; the controlled night temperatures were lowered 5° from October to March. *C. pubescens* grew best and produced most dry weight and total alkaloids in (2), but survived best in (4), perhaps on account of competition; *C. ledgeriana* grew best in (3), and showed no consistent relation between temperature and alkaloids. Low temperature increased the root/shoot proportion of *C. ledgeriana*.—Mayaguez, Puerto Rico.
2613. CHANDRARATNA, M. F. 633.88.51-1.535
Studies on the vegetative propagation of cinchona. 1. The effects of temperature, cutting length and presence of buds and leaves on root formation. *Trop. Agriculturist*, 1946, 102: 155-8, bibl. 9.
Factors affecting the rooting of cuttings were investigated as an essential preliminary to the establishment of clonal seed gardens. *Ledgeriana* cuttings struck root more readily than *succirubra* cuttings. Percentage root strike was significantly higher in apical than in sub-apical cuttings, except with long *succirubra* cuttings. In apical *succirubra* cuttings, percentage root strike was higher in 1½-2 inch cuttings than in 4-6 inch cuttings. Defoliation of cuttings did not affect the appearance of root initials or their subsequent development. The difference in temperature between nurseries under glass and in the open was not reflected in a difference in percentage strike. [From author's abstract.]
2614. CHANDRARATNA, M. F. 633.88.51
A note on the technique of frameworking cinchona for seed production. *Trop. Agriculturist*, 1946, 102: 159.
Cleft-grafting was adopted as the best method for frameworking *Cinchona ledgeriana* on *C. succirubra*. The technique is described. In skilled hands a take of 90% was obtained. A labourer can make about 30 grafts a day.
2615. (OFFICE DU QUINQUINA, COSTERMANNVILLE.) 633.88.51-1.53
Un essai intéressant de multiplication végétative. (An interesting trial of vegetative propagation.) *Bull. agric. Congo belge*, 1947, 38: 426.
Material: green shoots from the base of plants of *Cinchona ledgeriana*, 2½-4½ years old, from which samples of bark had been removed for analysis; pulled off and set in a shaded nursery, 96-98% rooted. [A planter's note.]
2616. BALDWIN, J. T., Jr. 633.912
Hevea rigidifolia. *Amer. J. Bot.*, 1947, 34: 261-6, bibl. 17.
The writer collected this material again, and seedlings are now established at the Instituto Agronômico do Norte, Belém, Pará. They appear free from South American leaf blight. Smears of young leaves showed 2n=36.
2617. MENDES, L. O. T. 633.912: 581.163
Poliembriõnia em *Hevea brasiliensis* Muell. Arg. (Polyembryony in rubber.) [English summary 3 lines.] *Rev. Agric. São Paulo*, 1947, 22: 161-4.
The author observed that polyembryonic seeds are very rare in the rubber tree *Hevea brasiliensis* Muell. Arg. One polyembryonic seed was found in each group of about 7,000 seeds. [Author's summary.]
2618. ANON. 633.912
Clonal seed as planting material. *Advis. Circ. Rubb. Res. Scheme* (Ceylon), 26, 1947, pp. 4.
Some general notes on the subject of clonal seed as an alternative to budded rubber. The planting of large areas with any type of clonal seed is considered risky under present conditions in view of the lack of information on the subject. Planters are encouraged to carry out trials of the seedlings derived from the various clones in their plantations and to keep the necessary records.
2619. STAHEL, G. 633.912-1.535
A new method of rooting cuttings of *Hevea* and other trees. *Trop. Agriculture, Trin.*, 1947, 24: 4-6, bibl. 8.
Cuttings of *Hevea* and some other light-demanding trees cannot be successfully rooted in the I.C.T.A. propagator on account of the low light intensity. By removing the lids in the daytime and keeping the cuttings continuously sprayed with water, the light may be increased up to 50% of full sunlight with beneficial results. With 25% sunlight and the continuous daytime spray cacao can be propagated by single-leaf cuttings, which have some advantages over branch-cuttings. In an experiment where CO₂ was added to the atmosphere round the cuttings there was increased callus formation, but the number of cuttings rooting was less than in the controls. [Author's summary.]
2620. CAKE, W. E. 633.912
Improved production on rubber plantations. *Better Crops with Plant Food*, 1946, 30: 6: 6-15.
Nitrogenous manures improve rubber yields appreciably and quickly in Sumatra and Malaya; potash has only been beneficial in sandy river-bed soils. Genetical selection in time leads to much greater increases. On the estates of the U.S. Rubber Co. improved clones, adequately manured, produce ten times as much rubber as did the early plantings.
2621. ANON. 633.912: 631.564.2
Bale packing of rubber. *Circ. Rubb. Res. Inst. Malaya* 24, 1947, pp. 3.
Advice on the preparation of bare-back bales. No hessian or iron strips are used.
2622. MENDES, L. O. T. 633.912-2.4
Sobre a ocorrência da Rubelose (*Corticium salmonicolor* B. & Br.) na Seringueira (*Hevea brasiliensis* Muell. Arg.). (Pink disease on rubber.) [English summary 6 lines.] *Rev. Agric. São Paulo*, 1947, 22: 157-60, bibl. 10.
The author reports his finding of the first case of "Pink disease" caused by *Corticium salmonicolor* B. & Br., in a rubber tree (*Hevea brasiliensis* Muell. Arg.) growing at the Instituto Agronômico do Norte, Belém. The diseased

branches were cut off and destroyed by fire. The wound was treated with bordeaux paint. The disease disappeared from the plantation. [Author's summary.]

2623. MASSIBOT, J. A., AND BOEUF, P. DE F. 634.1/8: 551.566.1

La conduite des recherches sur les cultures fruitières tropicales. (The conduct of research in tropical fruit culture.)

(Publ.) *Inst. Fruits Agrumes Coloniaux,* Sér. tech. No. 2*, 1947, pp. 31.

The design of an agricultural research programme should be governed by the economic importance of the results expected and the interest of the whole must take precedence over individual interests. Having laid down these axioms the authors set forth the nature of the research that should be undertaken on tropical fruit culture and indicate the organization which the I.F.A.C. should adopt in order to carry out its mission. Mention is made of a new central fruit research station being established near Kindia in French Guinea and of several regional stations in French Guinea, the Cameroons, the Ivory Coast, Martinique and Guadeloupe, of which the first two named are under construction.

2624. KALRA, A. N. 634.1/8(545)

Fruit industry in Simla Hills.

Punjab Fruit J., 1947, 11: 222-6.

Some details of what appears to be a promising industry, mainly in deciduous tree-fruits and, at lower elevations, citrus. The various districts and their fruits are described. Grading, marketing and costs of production are briefly dealt with.

2625. SCHWARZENBERG, C. 634.413: 581.162.3

Polinización artificial del chirimoyo. (Artificial pollination of the cherimoyer.) [English summary 10 lines.]

Agric. tec. Chile, 1946, 6: 156-72, bibl. 1.

Cherimoyers hand pollinated by Schroeder's method [*H.A.*, 12: 574] produced considerably more fruit than trees pollinated naturally; the increase more than justified the additional cost. Three varieties gave better results when pollinated within the variety.—Quillota.

2626. WADDINGTON, G., AND CIST, F. M. 634.421: 577.16

The vitamin C content of *Psidium guajava*, *Proc. Fla. St. hort. Soc.* 1942, pp. 110-12, bibl. 8 [received 1947].

The average value found was 564 mg. of ascorbic acid per 100 g. of fruit, with extremes of 37 and 1,160 mg. Concentrates from dried guava flesh gave as much as 5.2% ascorbic acid.

2627. MUSTARD, M. J. 634.421: 577.16

Ascorbic acid content of some Florida-grown guavas.

Bull. Fla. agric. Exp. Stat. 414, 1945, pp. 14, bibl. 7.

Ascorbic acid determinations were made on fruits from various guava species, seedlings and seedling-races growing under comparable conditions. The results are summarized.

2628. RUEHLE, G. D. 634.421

Promising new guava varieties.

Proc. Fla. St. hort. Soc. 1946, pp. 127-31, bibl. 9.

The first published description of three new varieties: Supreme, Red Indian, and Ruby.

2629. GUPTA, S. N. D., AND RAI, J. N. 634.421-2.48

Wilt disease of guava (*Psidium guajava* L.).

Curr. Sci., 1947, 16: 256-8.

A preliminary note on a disease which is fast becoming a menace in parts of India. The disease is associated with a

Fusarium fungus the pathogenicity of which has been established. Investigations are still in progress [June 1947].

2630. EGLER, F. E. 634.431

The role of botanical research in the chicle industry.

Econ. Bot., 1947, 1: 188-209.

The writer draws attention to the sparse, spasmodic, and generally sterile research—largely not recorded—on *Achras zapota*; the industry is entirely dependent on the exploitation of wild trees, many of which are killed in the process. Success in rooting cuttings by air-layering is reported as possible means to supplement natural regeneration in the forest. [See also *Tech. Comm. Imp. Bur. Fruit Prod.* No. 7, pp. 18-19.]

2631. MARLOTH, R. M. 634.441(68)

The mango in South Africa. II.* Propagation and cultural practices. III (a) Production and marketing. III (b) Diseases and pests.

Fmg S. Afr., 1947, 22: 523-31, 609-19, bibl. 8.

Part II. The best South African varieties are polyembryonic and propagation is mainly by seedlings. Approach grafting, root-grafting and side grafting are mentioned, and the budding method used at Nelspruit is described in detail. Budwood is selected from wood of the 2nd or 3rd flush from the ends of the branches. Just before the terminal buds flush, a fortnight before removal, all leaf blades are cut from the petioles on the bud stick, and a $\frac{1}{4}$ -in. complete bark girdle is made at the base of the stick. With stocks above 1 in. in diameter patch-budding is used, with smaller stocks shield-budding is preferred; stocks should be actively growing. The bud is cut round with the knife at right angles to the bark, and slid off by flexing the stick and squeezing the sides of the cut; raffia should be tied over the whole bud for 3 weeks, then re-tied to expose the bud. As only 50% success may be expected, two buds should be placed on each stock. It is desirable to prune the roots some months before transplanting, and to defoliate the tree immediately beforehand; trees should be spaced from 25 to 45 ft. apart, depending on soil and moisture availability, in large, well-manured holes. The biennial bearing habit of the mango has delayed the interpretation of fertilizer and irrigation trials at Nelspruit; cultivation and cover cropping should be practised as for other orchard crops, and disking is preferable to ploughing.

Part III (a). Yields are discussed and practical instructions are given on the subjects of picking, packing and marketing. Reference is made to artificial ripening and by-products. Part III (b). While the tree itself is relatively free of diseases, a number are listed which attack blossom and fruit, causing appreciable loss of crop each year. South Africa is fortunate in having no mango pests of economic importance.

2632. NAIK, K. C. 634.441(548)

Mango research in Madras.

Punjab Fruit J., 1947, 11: 210-13.

A brief sketch covering variety studies, new hybrids, tree selection, vegetative propagation, rootstocks and erratic cropping.

2633. MUSTARD, M. J., AND LYNCH, S. J. 634.441: 581.145

Flower-bud development of mangos.

Proc. Fla. St. hort. Soc. 1945, pp. 180-2, bibl. 2.

A short account of a study undertaken to determine the approximate time of year at which floral differentiation and subsequent floral development occur.

2634. NAIK, K. C. 634.441-1.541

Mango propagation methods at Fruit Research Station, Kodur [Madras].

Indian Fmg, 1947, 8: 22-5.

* For Part I see *ibid.*, 22: 457-63; *H.A.*, 17: 1735.

Inarching is the traditional method of vegetative propagation. It has been shown that side-grafting can be more effective, economical and convenient with some mango varieties. Budding has also been found a useful method. There is some indication that polyembryonic rootstocks impart better scion-vigour than mono-embryonic stocks. Other indications are that double-working imparts precocious and prolific bearing tendencies to the scions double-worked on productive varieties as intermediate stem pieces, though such double-worked plants are likely to produce rather dwarfed scion trees.

2635. HUME, E. P. 634.471
Difficulties in mangosteen culture.

Trop. Agriculture, Trin., 1947, 24: 32-6, bibl. 35.
The optimum conditions for growth are described. The so-called seed contains an asexually produced adventitious embryo, consequently there is little variation between trees. The seed is short-lived unless specially packed to prevent drying. Small seeds are unsatisfactory. Seedlings need careful nursing. If the roots are confined the loss of seedlings is high. Grafting experiments failed because of incompatibility of stocks. Trees do not begin to bear until 8 to 20 years old. The fruit needs careful handling, especially if shipped.

2636. GROFF, G. W. 634.571
Some ecological factors involved in successful lychee culture.
Proc. Fla. St. hort. Soc. 1943, pp. 134-55, bibl. 6 [received 1947].

After dealing briefly with the history and taxonomy of the lychee the author discusses, at length, its reactions when transferred from its natural environment and the requirements for successful cultivation. He concludes that the lychee is an excellent illustration of the hazards involved in plant introduction.

2637. JORDAHN, A. C. 634.6
Promising new palm introductions [to Florida].
Proc. Fla. St. hort. Soc. 1946, pp. 135-7.

Short descriptions are given of 18 "newer successes" in the palm collection at the Fairchild Tropical Garden, Florida, which contains over 350 species and varieties.

2638. CHEVALIER, A. 634.6
L'arbre à beurre d'Afrique et l'avenir de sa culture. (The African butter-tree and its future cultivation.)
Oléagineux, 1946, 1: 7-11.

After a brief sketch of various oil-yielding trees, including the olive, the author turns to the possibility of exploiting some African trees, particularly the karité (*Butyrospermum parkii*). The distribution of this tree, which has numerous varieties, is shown. The need for selection and breeding is stressed.

2639. FERRAND, M. 634.6
La culture du palmier à huile. (Oil-palm cultivation.)
Oléagineux, 1947, 1: 1-10.

The author describes the methods adopted in various countries for establishing oil-palm plantations. He finally concludes that in new countries planters cannot make real progress without the assistance of specialized research institutes.

2640. BRIDGES, A. F. B. 634.6(669)
The oil palm industry in Nigeria.
Farm and Forest, 1946, 7: 54-8.

An article compiled from notes for a survey of the oil-palm industry in Nigeria. The instructions were to find out what difficulties, if any, stood in the way of establishing palm plantations and to suggest how they might be overcome. Some of these difficulties are described and discussed.

2641. PHILLIS, E. 634.61
An outline for a coconut selection scheme.

Proc. agric. Soc. Trin. Tob., 1946, 46: 155-9.
After reviewing the problem the author puts forward a long-range scheme which entails the active co-operation of growers, who would be asked to select high-yielding palms on their estates, from which the Department of Agriculture could obtain plant material for yield-trials. The procedure to be followed for the yield trial stage to the release of pedigree nuts from high bearing parents is described. An advantage of the scheme is that it avoids the necessity for hand-pollination and the keeping of individual tree records.

2642. CHILD, R. 634.61
The regeneration of coconut properties.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 8, bibl. 8.

A presentation of the best statistical information at present available bearing on the regeneration of coconut estates in Ceylon. The author indicates what conclusions may be drawn regarding the extent of the replanting problem and indicates how the situation can be tackled.

2643. SALGADO, M. L. M. 634.61-1.8
Some problems of coconut manuring.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 9-16.

Although many problems of coconut manuring and cultivation still need investigation, there is ample scope for improvement in the industry through the application of knowledge already gained from experimental work.

2644. BAPTIST, B. A. 634.61-2.7
The control of insect pests of coconut.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 38-44.

The four major pests are *Oryctes rhinoceros*, *Rhynchophorus ferrugineus*, *Nephantis serinopa*, and *Aspidiotus destructor*. These are described and control measures outlined. It is stated that pest control is receiving but scant attention in Ceylon, partly because of the absence of reliable statistics to show the economic significance of insect-pest damage. An accurate survey, not only of pest incidence and intensity, but of the actual economic loss from insect pests in each district, is essential.

2645. PEIRIS, A. J. C. 634.61
Coconut in Ceylon: its productivity and possibilities.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 45-50, bibl. 3.

The world's acreage of coconut palms in 1938 was estimated as 9½ million, of which Ceylon contributed over 1 million acres. Since 1934 there has been a steep decline in Ceylon's production, caused, according to the author, by: neglect of plantations, planting unsuitable lands, bad weather from 1943 to 1945, low-yielding and senile palms, neglect of pests and diseases and the felling of plantations for defence purposes. Yields from seven estates are quoted which vary from approximately 900 to 1,400 nuts per acre. It would be possible to increase yields on such estates by 50% within 5 years. The present low yield from coconut plantations is in striking contrast with tea and rubber yields in Ceylon which have increased by about 150% in the past 25 years. The need for systematic cultivation and manuring is stressed and the results from two controlled manual experiments are quoted, both of which showed the value of potash fertilizers. Cover crops, weeds, grasses and mechanized agriculture are briefly touched upon.

2646. DE MEL, R. H. 634.61-1.56
Developments in the marketing of coconut products.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 51-8.

An account of the activities of the Ceylon Coconut Board from 1935 onwards in its efforts to improve the quality of coconut products and benefit the producer.

2647. BRUN, J., AND MERNY, G. 634.771-2.4
La maladie du "bout de cigare" de la banane.
(Cigar-end disease of the banana.)

Fruits d'Outre-Mer, 1947, 2: 191-2, bibl. 10.

Stachyidium theobromae Turconi, on a cargo of bananas from the French Cameroons, chiefly on *Musa cavendishii*. Symptoms are described. To control it the pistil and the perianth of the young fruit should be removed and maximum aeration should be afforded.

2648. SIMMONDS, J. H. 634.771-2.4
Squirter-disease of bananas.
Qd agric. J., 1947, 64: 329.

Growers are prone to underestimate the seriousness of this disease which, fortunately, can be controlled.

2649. HEIM, P. 634.771-2.4
Moyens de lutte contre la pourriture de la hampe du bananier. (Methods of fighting banana stem-rot.)

Fruits d'Outre-Mer, 1947, 2: 262-3.

An extract of an article which appeared in *Revue de Mycologie, Supplément Colonial*, 1946, Vol. 11, pp. 20-8.

2650. VÉLEZ, I., AND BADILLO, V. M. 634.774(87)
Comentarios sobre los piñales silvestres y cultivados de la región del Parguasa, Guayana Venezolana. (Notes on wild and cultivated pineapples near the river Parguasa, Venezuelan Guiana.)

Rev. Agric. Puerto Rico, 1946, 37: 127-30, bibl. 8.

These are mainly small forms producing seeds, and a collection has been transferred to the Institute of Tropical Agriculture, Mayaguez, for cytogenetic studies.

2651. VAN OVERBEEK, J., DE VÁZQUEZ, E. S., AND GORDON, S. A. 634.774: 577.17
Free and bound auxin in the vegetative pineapple plant.

Amer. J. Bot., 1947, 34: 266-70, bibl. 17.

The auxin content of various parts of the plant was evaluated by extraction with diethyl ether, followed by the *Avena* test; the amount extracted in the first hour is assumed to be free, and that extracted in the next 15 hours to be bound. Free auxin was highest at the apex of the axis; bound auxin was highest in the bases of the youngest leaves. The authors conclude that the flower-inducing free auxin of the axis evolves from the bound auxin of the bases of the young leaves [see also *H.A.*, 17: 1012].

2652. COOPER, W. C., AND REESE, P. C. 634.774: 581.145.1
Induced flowering of pineapples under Florida conditions.

Proc. Fla. St. hort. Soc. 1941, pp. 132-8, bibl. 8 [received 1947].

A report on an investigation into the effect of certain unsaturated hydrocarbons, such as ethylene and acetylene, on floral initiation in pineapples.

2653. SIDERIS, C. P., AND YOUNG, H. Y. 634.774-1.84

Effects of nitrogen on chlorophyll, acidity, ascorbic acid, and carbohydrate fractions of *Ananas comosus* (L.) Merr.

Plant Physiol., 1947, 22: 97-116, bibl. 31, being *Tech. Pap. Pineapple Res. Inst., Univ. Hawaii* 164.

N was supplied as NO_3 or NH_4 , at 140 or 2.8 mg. per litre of nutrient solution. Green parts of healthy leaves had a higher percentage of dry matter, chlorophyll, carotenoids, acidity (as citric acid), ascorbic acid, and sugars in high-N

than in low-N cultures, irrespective of N-type. Starch in green leaves was greater in high-N than in low-N for NO_3 , but the reverse held for NH_4 . The effects are fully discussed. [See also *H.A.*, 16: 2239.]

2654. SIDERIS, C. P., YOUNG, H. Y., AND CHUN, H. H. Q. 634.774-1.84
Effects of nitrogen on the nitrogenous fractions of *Ananas comosus* (L.) Merr.
Plant Physiol., 1947, 22: 127-48, bibl. 45, being *Tech. Pap. Pineapple Res. Inst., Univ. Hawaii* 171.

A. comosus grown in high-N cultures (140 mg. per litre of nutrient solution) absorbed five times as much N as in low-N (2.8 mg.), whether NO_3 or NH_4 was used. Total-N and protein-N were 3-4 times, and soluble N was 4-8 times greater in high-N than low-N cultures. Soluble organic-N was higher in the green parts of the leaves, and higher with NH_4 than with NO_3 . Protein-N generally correlated to mono-amino-N and basic-N. The results suggest a continuous formation of amino-N from proteins undergoing normal hydrolysis in the cell, or the synthesis of proteins by condensation of amino acids in cultures supplied with either adequate or inadequate inorganic-N. Excess of N supplied as NH_4 or NO_3 may cause accumulations of soluble organic-N fractions produced by enzymatic synthesis from ammonia with carboxylic acids, and similar to those presumably released from protein breakdown. [From authors' summary.]

2655. SIDERIS, C. P. 634.774: 581.1
Chlorophyll and protein interrelationships in *Ananas comosus* (L.) Merr.
Plant Physiol., 1947, 22: 160-73, bibl. 39, being *Tech. Pap. Pineapple Res. Inst. Univ. Hawaii* 169.

Chlorophyll and protein are positively correlated in the green parts of pineapple leaves with adequate nutrition and light. Shortage of Fe, N, or light decreased chlorophyll and protein, but their relation is not affected by the level of K. The chlorophyll/protein ratio in mature green leaves approached Hanson's theoretical value of 0.055, but it was greater in young leaves. Protein-N, rather than soluble organic-N, appears to be directly related to chlorophyll, as the protein-N/soluble organic-N ratio is 3:1 in the chlorophyllous part of the leaf and 1:1 in the rest. These results suggest that chlorosis in plants is due to lack of chlorophyll/protein balance due to deficiencies of substances essential for the synthesis of chlorophyll or protein, or to conditions (high Mn) that inhibit such synthesis or the proper operation of the chlorophyll-protein system. Normalcy may be restored by removal of the deficiencies or the adverse conditions. [From authors' summary.]

2656. MERNY, G., AND BRUN, J. 634.774-2.4
Les maladies de l'ananas dues à *Thielaviopsis* (*Ceratostomella*) *paradoxa*. (Pineapple diseases caused by *Thielaviopsis* (*Ceratostomella*) *paradoxa*.)

Fruits d'Outre-Mer, 1947, 2: 213-18, bibl. 45.

Leaf spot, base-rot, and water blister, black-rot, or soft-rot of pineapple; biology and control of the parasite.

2657. WESTGATE, P. J. 634.774-2.752
Mealybug-wilt of pineapples in south Florida.
Proc. Fla. St. hort. Soc. 1945, pp. 194-6, bibl. 8.

The pineapple industry in Florida has to contend with two major problems, low temperatures and mealybug-wilt.

2658. FENNELL, J. L. 634.836.3: 551.566.1
The tropical grape.
Reprinted from *The Scientific Monthly*, 1945, 61: 465-8.

An interesting account of the development of cultivated grape varieties suited to the tropics. The author divides

the world's wild and cultivated grapes into 3 climatic groups: the arid-temperate, the humid-temperate and the humid-tropical. It is the last named, of which there are 14 or more wild species, which have been successfully used in breeding work for developing tropical varieties; a new and promising venture.

2659. NIJHOLT, J. A. 641.1: 635.65
Giftigheid en voedingswaarde van kratokboonen
(*Phaseolus lunatus*). (Poison content and nutri-
tive value of kratok beans.) [English summary
½ page.]
Landbouw, 1947, 19: 356-67, bibl. 40.

Seeds of 38 varieties of *Phaseolus lunatus*, cultivated in 1941 and 1942 at Probolinggo, East Java, varied in content of hydrocyanic acid from 270 to 2,430 mg. HCN per kg. HCN content was only slightly correlated with colour. Large beans were least poisonous, medium beans very poisonous. Although climate and soil probably affect HCN content, the varietal differences were of the same order each season. Protein content ranged from 17.4 to 22.4% and carbohydrate from 45.3 to 51.8%.

2660. CHAKRAVARTY, H. L. 589.8(54)
Studies on Indian *Cucurbitaceae*: with special
remarks on distribution and uses of economic
species.

Ind. J. agric. Sci., 1946, 16: 1-90, bibl. 92.
After a short introduction setting forth the histological, morphological and economic interest of the Indian *Cucurbitaceae*, the author proceeds to deal with geographical distribution, nomenclature, internal morphology, cytology, affinities and medicinal properties. The greater part of the monograph is devoted to a description of the general and diagnostic characters of some 86 species. There is a key to the tribes and genera, also 12 plates and 4 text figures.

2661. MOH'D SA'AD BIN SHEIK DAUD. 635.2: 551.566.1
Ubi kemili. (*Coleus tuberosus*).
Malay. agric. J., 1947, 30: 130-2.

A description, with one illustration, of a little-known tropical vegetable with notes on its propagation, cultivation, harvesting and uses. It is said to make a good substitute for potatoes.

2662. FAIRCHILD, D. 635.41: 551.566.1
Talinum, a summer vegetable for Florida.
Proc. Fla St. hort. Soc. 1943, pp. 187-90 [received
1947].

A description of a tropical spinach plant, *Talinum triangulare*, which gives a crop during the long Florida summer when ordinary spinach fails to grow. Directions are given for growing and cooking the plant. Its vitamin C content is good.

2663. BOURQUET, G. (I), AND MALLAMAIRE, A. (II). 635.8: 551.566.1

Culture de champignons comestibles dans les régions tropicales. I. Essais de culture de volvaires à Madagascar. II. La volvaire comestible: *Volvaria volvacea* (Fr. ex Bull.) Quelet en Afrique Occidentale et aux Antilles. (Growing edible mushrooms in the tropics. I. Volvarias in Madagascar. II. The edible volvaria in West Africa and in the Antilles.)
Agron. trop., 1946, 1: 582-8, bibl. 15.

Part I describes the culture of the cosmopolitan *Volvaria volvacea* near Tananarive, at an altitude of 1,300 m. Small bundles of rice straw (preferably *Oryza glutinosa*), soaked in water for 2 days, are arranged in beds 2 m. × 0.9 m. × 0.8 m. high; two petrol tins of rice straw ashes are scattered on each layer, followed by a mixture made by soaking 5 kg. crushed paddy in 5 l. water for 4-5 days. Five or six layers

constitute a bed, and each should be spawned either with laboratory culture or with spontaneous *Volvaria*. Temperature and humidity should be high, but excessive watering is harmful. The bed should be productive for 3 weeks from the 15th day. If the harvest is too plentiful, the mushrooms keep well if dried in the shade and stored in tin boxes. Part II.—In French West Africa this species is known as the oil palm mushroom as it frequently appears on palms felled for palm wine; it also appears on coffee pulp, banana stems, and decomposed grasses and legumes.

2664. MATTHEWS, R. E. 635.974: 551.566.1
Ornamental tropical vines.

Proc. Fla St. hort. Soc. 1946, pp. 132-5.

'Short, non-technical descriptions are given of some ornamental climbers in the Fairchild Tropical Garden, Florida.

2665. a ANON. 634.771
Banana hopes.

Crown Colon., 1947, 17: 504.

The Lacatan from Jamaica.

- b BARNES, J. W. 635.9(689.1)
Some trees, shrubs, shrubby-herbaceous plants,
climbers and water plants suitable for the
Colony [S. Rhodesia].

Rhod. agric. J., 1947, 44: 110-41.

Replaces *Bull.* 1267 now out of print. Illustrated.

- c BROOKS, J. R. 632.183: 551.566.1
Hurricane damage to commercial fruit trees in
Dade County [Florida].

Proc. Fla St. hort. Soc. 1946, pp. 149-51.

Hurricane of 15 September, 1945.

- d CHEVALIER, A. 633.73

Les caféiers du globe. (Coffees of the world.)
*Fascicule II. Iconographie des caféiers sauvages
et cultivés*. (Wild and cultivated coffees.)

Paul Lechevalier, Paris, 1942, pp. 35, 158 plates,
reviewed in *C.R. Acad. Agric. Fr.*, 1943, 29:
161 [received 1946].

- e FAIRCHILD, D. 634.413
Some observations on the cherimoyas of Colombia
and Guatemala.

Proc. Fla St. hort. Soc. 1942, pp. 99-104 [received
1947].

- f FALLON, F. 632.951

Derris et Lonchocarpus, insecticides végétaux.
(Derris and Lonchocarpus, plant insecticides.)
Bull. agric. Congo belge (Bruxelles), 1941, 32:
112-25 [received 1947].

- g FRAPPA, G. 634.61-2.76

Un nouveau parasite du cocotier à Madagascar,
Diocalandra taitensis Guer. (A new coleopterous
parasite of the coconut palm in Madagascar.)
Agron. trop., 1947, 2: 299-302, bibl. 9.

- h FREYRE, R. H. 634.421

More guavas in Puerto Rico.
Agric. Amer., 1947, 7: 113-15.

An informative, popular article.

- i GADD, C. H. 633.72-2.76

Studies of shot-hole borer of tea; Pt. 2. Gal-
leries.

Tea Quart., 1947, 18: 114-23, bibl. 13.

- j GOVERNMENT FOREST NURSERY, SALISBURY. 631.537

List of forest-tree transplants, ornamental trees
and shrubs, hedge plants, creepers and seeds
obtainable at the Government Forest Nursery,
Salisbury, S. Rhodesia, September 1947.
Rhod. agric. J., 1947, 44: 182-96.

- k HÉBERT, —. 633.526.23
Le sisal aux Iles Comores. (Sisal in the Comoro Islands.)
Agron. trop., 1947, 2: 279-98.
- l LIVERA, E. J. 634.651-1.459
Soil conservation with particular reference to coconut cultivation.
Papers read before the Coconut Conference, Colombo, July, 1947, pp. 29-37.
- m LOOMIS, H. F. 632.183: 551.566.1
Hurricane damage to tropical plants [in Florida].
Proc. Fla. St. hort. Soc. 1946, pp. 146-9.
Hurricane of 15 September, 1945.
- n MANNING, J. D. 633.72-2.4
A review of developments in the blister-blight situation between December 1946 and March 1947.
Plant. Chron., 1947, 42: 177-82.
- o MUKHERJI, S. 633.853.74: 632.78
Relation of total soluble solids in the cell sap of *Sesamum* species to the degree of susceptibility and resistance to *Antigastra* (Lepidoptera-Pyralidae) attack.
Nature, 1947, 160: 95-6, bibl. 3.—Indian Agricultural Research Institute, New Delhi.
- p MUSTARD, M. J. 577.16: 634.441+634.421
Mangos and guavas as sources of ascorbic acid.
Proc. Fla. St. hort. Soc. 1945, pp. 187-90, bibl. 3.
Both excellent.
- q PAULIAN, R. 634.711-2.76
Les *Metamasius*, charançons du bananier dans l'Empire Français. (The genus *Metamasius*, weevils attacking bananas in the French Empire.)
Fruits d'Outre-Mer, 1947, 2: 68-72, bibl. 29.
- r PIEDRAHITA, F. 634.39
Monografía del árbol del pan. (On the breadfruit [*Artocarpus* spp.].)
Rev. Inst. Def. Café Costa Rica, 1947, 17: 517-23, bibl. 14.
- s RAMASARMA, G. B., RAO, S. D., AND HAKIM, D. N. 634.441
Carotenoid pigments of Badami mango fruit.
Biochem. J., 1946, 40: 657-9, bibl. 18.
- t STEWART, W. S., AND HUMMER, R. W. 633.912
Inverse correlation between rubber hydrocarbons and insolubles in total solids of latex from *Hevea brasiliensis*.
Plant Physiol., 1947, 22: 193-6, bibl. 1.
See also *H.A.*, 15: 1298(h).
- u THAPER, L. A. R. 634.1/8(545)
Development of fruit industry in Simla Hill States.
Punjab Fruit J., 1947, 11: 158-61.
General ideas.
- v YOUNG, T. W. 634.441: 581.162.3
Investigations of the unfruitfulness of the Haden mango in Florida.
Proc. Fla. St. hort. Soc. 1942, pp. 106-10 [received 1947].

PACKING AND STORAGE.

2666. PENNEY, F. C. 634.11-1.564
Co-operative apple packing.
Agriculture, 1947, 54: 252-6.
A plea for co-operative packing by the grower of 20-200 acres of apples is followed by an account of the methods used by the Kirdford Growers at Billingshurst, Sussex. Details are given of operating methods, grade percentages, packing and storing charges, the method of payment (piece-work preferable), output and costs.
2667. CLAUS, J. 631.564
Nieuwe inzichten bij de verpakking van tuinbouwproducten. (New methods of packing garden produce.)
Tuinbouw, 1947, 2: 159-61.
This article on the packing of garden produce so as to preserve its qualities and to give it an attractive appearance is based on observations made during a visit to the United States, and deals particularly with the use of pliofilm.
2668. SMITH, W. H. 581.192: 664.85.11
A new method for the determination of the composition of the internal atmosphere of fleshy plant organs.
Ann. Bot. Lond., 1947, 11: 363-8, bibl. 5.
Damage to tissues is reduced by the use of a hypodermic needle, through which 0.5 to 2 ml. is withdrawn into the usual micro-gas-analysis apparatus. Extractions from apples lasting from 1 minute to 16 hours gave similar analyses.—Ditton Laboratory, East Malling.
2669. DENNY, F. E. 664.8.035.1
Changes in oxygen, carbon dioxide, and pressure caused by plant tissue in a closed space.
Contr. Boyce Thompson Inst., 1947, 14: 383-96, bibl. 7.
Materials used: roots of turnips and sweet potato, fruits of apple and tomato, and tubers of potato.
2670. ISHERWOOD, F. A. 581.192: 664.85
The determination and isolation of the organic acids in fruit.
Biochem. J., 1946, 40: 688-95, bibl. 14.
A simple method has been devised to extract both the volatile and the non-volatile acids from fruit without subjecting any of the solutions to a temperature above 35°. The acidified fruit juice is absorbed into silica gel and extracted in the form of a column with 50% (v/v) *n*-butanol-chloroform, the fruit acids in this solution then being concentrated and dissolved in 50% (v/v) *tert*-amyl alcohol-chloroform for analysis. The mixture of acids is separated using a modified partition chromatogram. [From author's summary].—Low Temperature Station, Cambridge, and Dep. Sci. Industr. Res.
2671. AUBERT, P. 664.85
Méthode nouvelle pour la conservation des fruits: la cave Kresber. (A new method of storing fruit: the Kresber cellar.)
Rev. romande Agric. Vitic., 1945, 1: 9: 5-7.
The principles underlying the method described are (1) The cellar is well insulated either by being sunk in the ground and covered with a layer of soil or by means of insulating material, e.g. a double wall containing glass wool. (2) It contains a chamber of equilibrium on the floor of which is a layer of moss kept moist by spraying with water. The role of the moss is (1) to lower the temperature of the air by the evaporation of water from the moss, (2) to regulate and maintain a maximum humidity of the air, and (3) to regenerate and purify the air and to absorb the emanations from the ripening fruit. Allowance is made for ventilation. The construction of a Kresber cellar is shown by a drawing.
2672. HITIER, H. 664.85
Mauvaise conservation des fruits. (Deterioration in stored fruit.)
C.R. Acad. Agric. Fr., 1943, 29: 487-8 [received 1947].

In dry, warm, sunny years the high sugar content of fruit favours the growth of bacteria, so that the fruit stores less well.

2673. SYKES, S. M. 664.85: 632.4
Mould wastage in the storage and transport of fruit.

Agric. Gaz. N.S.W., 1947, 58: 201-4.

Improvement in storage technique has reduced the incidence of functional and non-parasitic disorders, with the result that a greater proportion of the losses in storage is now due to rots caused by various fungi. There is also some evidence of an actual increase in the amount of rot in recent years possibly as a result of the reduced use of copper sprays. The factors affecting mould development are (1) those of pre-harvest, in the orchard, (2) those related to picking, handling, grading, packing and storage. The locality, soil, rainfall and manurial treatment all appear to have an effect on subsequent rotting in storage. Orchard sanitation is stressed. The factors of the second group are most important since they are generally more under control. Plant shed hygiene and the sterilization of packing boxes should be routine practice. Prompt storage, rapid cooling and the maintenance of correct levels of temperature and humidity in the store should receive attention. Careful and rapid transport to the market is most desirable.

2674. ENGLISH, H., RYALL, A. L., AND SMITH, E. 664.85.11

Blue mold decay of Delicious apples in relation to handling practices.

Circ. U.S. Dep. Agric. 751, 1946, 20 pp., bibl. 27.

The extension of the storage and marketing season for Delicious apples has increased the risk of fungus decay mostly caused by blue mould (*Penicillium expansum*), although mechanical injuries such as stem punctures and box cuts have been greatly reduced in commercially packed fruit. One of the reasons why serious decay losses continue is that lenticels and other microscopic breaks in the skin frequently serve as avenues of infection. In general it was found that more open lenticels and more lenticel decay were found on washed than on unwashed fruit when both were dipped in a suspension of blue mould spores before packing. A delay of 3 days in a non-refrigerated warehouse decreased the susceptibility of the fruit to washing injury and blue mould infection. Cold storage for 2, 6 or 10 weeks prior to washing resulted in increased resistance to washing injury. When fruit was held for 6 weeks prior to washing its resistance to infection was consistently increased. Fruit packed while wet developed no more decay than that dried before packing. Susceptibility to blue mould infection varied in fruit from different orchards and in that from the same orchard during successive seasons. Severe washing increased both the number of open lenticels and the number of lenticel infections. The importance of careful handling in the control of blue mould decay is emphasized by the fact that many of the lenticel infections occurred in bruised areas.

2675. CROSS, P. E. 664.85.11

The clamp method of storing apples.

Grower, 1947, 28: 271, and *Fruitgrower*, 1947, 104: 338.

The clamp may be up to 4½ ft. broad by 3 ft. high, and only undamaged fruits, with stalks intact, should be stored thus. A light straw covering should be followed a fortnight later by the final covering of 9-12 in. of wheat straw thatch. Earth excavated from a trench 12-15 in. wide around the clamp should be packed against the base only of the thatch. Only varieties that store well (e.g. Cox, Superb) should be clamped; they should keep well into the New Year.

2676. KESSLER, H. 664.85.11

Das Verhalten der Sorte Schöner von Boskoop auf dem Lager. (The storage behaviour of Belle de Boskoop apples.)

Schweiz. Z. Obst- u. Weinb., 1947, 56: 109-12, bibl. 3.

Following an earlier paper on the storage of Boskoop apples (*ibid.*, 1941, 50: 279-84) the behaviour of fruits from the trees No. 8 and No. 12 of the same row has been compared for the period 1940/41-1946/47. Although both trees have received identical treatment, No. 12 has consistently shown a more vigorous growth and borne both larger and more uniform crops, while No. 8 in addition to its other faults is a biennial bearer. In storage, however, fruits from No. 8 proved in general very little subject to rot, whereas losses in fruits from No. 12 were considerable. After ruling out other factors the author concludes that the seedling rootstocks must be supposed largely to account for the differences in storage behaviour. Further, the variability in storage life of fruits from trees on the same rootstock is known to be a varietal character in Boskoop. Storage between 3° and 4° C. (never under 3° C.) will reduce losses.—Wädenswil Research Station.

2677. WHITTAKER, E. C. 664.85.11

The common storage of Granny Smith apples, in relation to scald and cold storage.

Agric. Gaz. N.S.W., 1947, 58: 303, 312.

An excessive period of common storage is liable to curtail the cool storage life and result in too much yellow colour, whilst the danger of serious losses from such physiological disorders as lenticel spot, late scald, etc., is greatly increased. It is suggested that after a week or two in common storage Granny Smiths be placed in cool store unwrapped and unpacked, and held until July when facilities are available to grade, size and oil wrap them prior to returning to cool store.

2678. HANSEN, E. 664.85.13.035.1

Effect of 2,4-dichlorophenoxyacetic acid [2,4-D] on the ripening of Bartlett pears.

Plant Physiol., 1946, 21: 588-92, bibl. 6.

Treatment with different concentrations of 2,4-D of pears harvested two weeks before maturity increased the rates of ripening, respiration, and ethylene production; the accumulation of ethylene was an added stimulus for all rates. The treatment of fresh mature fruit hastened ripening by two days; but mature pears, treated after 5 weeks' storage at 31° F., did not ripen earlier than controls.—Corvallis, Ore.

2679. COMBES, R. 664.85.13.035.1

Conservation des fruits par l'action du froid et de mélanges gazeux de composition déterminée. (The cold storage of fruit in gases of different composition.)

C.R. Acad. Agric. Fr., 1941, 27: 709-16 [received 1947].

In gas storage experiments with pears (var. Passe-Crassane) at a temperature of +1° C., the gas mixture found to give the best results consisted of 5-10% CO₂, 5% oxygen and 85-90% nitrogen.

2680. COMBES, R. 664.85.13.035.1

Recherches de 1941-1942 sur la conservation des fruits par l'action combinée du froid et de mélanges gazeux de composition déterminée. (Cold storage of fruits in gas mixtures in 1941-1942.)

C.R. Acad. Agric. Fr., 1942, 28: 557-9 [received 1947].

A continuation of the author's former work (see above, No. 2679) on low temperature gas storage of pears, using quantities on a commercial scale. Pears in normal air began to turn yellow in February while those in the gas mixture showed no signs of maturity when examined in May.

2681. PIETTRE, M. 664.85.13.037

Essais de conservation des poires William par la réfrigération en cascade, aperçu d'organisation du marché français des fruits. (Storing Williams pears by the cascade refrigeration method in relation to the sale of fruit in France.)

C.R. Acad. Agric. Fr., 1942, 28: 597-602 [received 1947].

The method described of keeping pears in cold storage is claimed to yield better results than the ordinary method at fixed temperature. In the "cascade" method the temperature is gradually reduced. Thus in the experiment described the average temperatures were: 5-29 August, 0° C.; 29 August-13 September, -0.3° C.; 13 September-10 October, -0.8° C.; 10-20 October, -1.3° C.; 20 October-18 November, -1.5° C., with -1.8° C. as the lowest temperature.

2682. SMITH, W. H. 664.85.22
Extending the storage life of the Victoria plum.*
J. Pomol., 1947, 23: 92-8, bibl. 13.

Internal browning of Victoria plums stored at 31° F. immediately after picking was completely controlled by storing at 65° F. for 2 days between the 15th and 20th day from the start of picking. The plums so treated ripened normally after they had been stored for 15-20 days longer at 31° F. Further storage at 31° F. (50-51 days) resulted in appreciable browning but less than in control samples treated on the 40th day. After 50-51 days at 31° F. the less mature had suffered more damage than the more mature fruit.—Ditton Laboratory, East Malling.

2683. MANARESI, A. 664.85.037
Ricerche sulla maturazione, sulla raccolta, sulla conservazione e sul modo di spedire le ciliege. (Ripening, picking, storing and transport of cherries); and Ricerche chimiche sulla conservazione in frigorifero di alcune frutta. (Cold storage of certain fruits.)
Riv. Frutticoltura, 1941, 5: 195-212, bibl. 20.
1942, 6: 29-41, bibl. 53 [received 1947].

In the first article the author discusses experiments made in 1930 with a view to determining the most suitable treatment to give to cherries for export. Numerous tables of analytical results allow the author to make certain proposals for improving the final products. (1) The cherries could be picked with advantage a little riper and without risk of deterioration, given due care in handling. (2) Air humidity and temperature should be low at the time of picking. (3) Packing should be done with care and the cases so placed in the trucks as to favour air circulation. (4) If carefully packed, e.g. in 5 kg. osier baskets, so as to ensure such air circulation and then placed in cold store they will be ready to enter the refrigerator car 24 hours later. Considerable attention is paid to foreign work on the subject. The second article is also interesting, not only for the author's own observations, but for the review of the results of foreign workers with cherries, plums and peaches.

2684. CRUESS, W. V., AND ARMSTRONG, M. 664.85.1
Experiments with antioxidants for walnuts.
Fruit Prod. J., 1947, 26: 327-8.

Nordihydroguaiaric acid (N.D.G.A.) and digallic acid dips showed promise in extending the shelf life of shelled walnut meat, which becomes rancid rapidly at room temperature. These, and other antioxidants, are being tested further.

2685. GUILLAUME, A. 634.53-1.55
Sur le traitement des châtaignes dès la récolte pour empêcher les altérations et faciliter la conservation. (Treatment of chestnuts before storage.)
C.R. Acad. Agric. Fr., 1943, 29: 124-6 [received 1946].

Immediately after harvest, chestnuts should be macerated in a 1½% solution of sodium bisulphite for 36 hours, washed and rapidly dried at 35-40° C. to a moisture content of 45%. This treatment reduces damage due to *Balaninus elephas*, *Laspeyresia splendana*, and the fungus *Sclerotinia pseudotuberosa*.

2686. MILLER, E. V. 664.85.3.037
The physiology of citrus fruits in storage.
Proc. Fla. St. hort. Soc., 1945, pp. 128-33.

A review of some investigations into this subject, together with recommendations for the cold storage of citrus fruit based on *Circ. U.S. Dep. Agric.* 278.

2687. BIALE, J. B., AND YOUNG, R. E. 664.85.334.035.1
Critical oxygen concentrations for the respiration of lemons.

Amer. J. Bot., 1947, 34: 301-9, bibl. 12.
Colour changes, CO₂ output and O₂ intake were followed in dark green lemons stored in O₂ concentrations of from 0 to 99.2%. In air, CO₂ rates decreased gradually; with higher concentrations of O₂, a climacteric rise occurred with lower concentrations, CO₂ rates fell until a critical O₂ level, between 0.5 and 5.0%, was reached, and then they increased. The best storage life was attained at 5% O₂, which also produced the lowest respiratory quotient.—Los Angeles, Calif.

2688. LOUCKS, K. W., AND HOPKINS, E. F. 664.85.3: 632.4
Some factors influencing citrus fruit decay experiments.

Proc. Fla. St. hort. Soc., 1946, pp. 20-6, bibl. 7.
An account of some storage experiments, the statistical significance of which is examined. The hope is expressed that a cheap compound will be discovered effective against citrus storage rots.

2689. SIEGLER, E. A., AND CHILDS, J. F. L. 664.85.31: 632.4
Isopropanol-soluble compounds in controlling stem-end decay of oranges.

Phytopathology, 1947, 37: 399-402.
Among the compounds tested, diphenyl sulphoxide benzyl alcohol and phenylurethane were found to be fungicidally or fungistatically active against the stem-end rot fungi, *Diplodia natalensis* and *Phomopsis citri*.

2690. LEONARD, E. R. 664.85.771
Studies in tropical fruits. XVII. The respiration of bananas in different concentrations of oxygen at 53° F., and during subsequent ripening in air at 68° F.

Ann. Bot., Lond., 1947, 11: 299-331, bibl. 24.
The respiration of "heavy ½ full" Gros Michel banana fingers has been studied during 19 days from harvesting in controlled moist atmospheres at 53° F., and during subsequent ripening in air at 68° F. During cool storage the rate of respiration is reduced, and the subsequent onset of ripening delayed, as the concentration of oxygen is decreased below that in air; when the concentration of oxygen is increased, the rate of respiration increases slightly, but ripening is not advanced. In all conditions used, the fingers ripened normally.—Trinidad.

2691. BRUN, J., AND MERNY, G. 664.85.771: 632.4
Sur une pourriture nouvelle des bananes "Gros Michel". (A new rot on Gros Michel bananas.)

Fruits d'Outre-Mer, 1947, 2: 37-42, bibl. 21.
From a shipment of Gros Michel bananas from the French Cameroons the authors isolated *Trachysphaera fructigena* (Tabor and Bunting), *Gloeosporium musarum* (Cooke and Massee), and various *Fusarium*, *Mucor*, and *Penicillium* spp. The unusual rot they describe was primarily due to *T. fructigena*; at 27° C. wounds inoculated with this produced symptoms in 72 h. and fructifications in 96 h. At laboratory temperatures (17° C.) symptoms appeared 7 days after inoculation, or 9-10 days after putting a suspension of spores on a sound banana. The attack usually starts about the middle of the long side of the banana; the skin becomes

* See also H.A. 7: 1759.

pale, brown and depressed, the fruit shrinks and the whitish floury fructifications appear. Provisionally the authors recommend that fruit be loaded within 36 hours of cutting, a storage temperature of 11-12° C. be reached within 2-3 days, and unsound fruit rejected while loading.

2692. SCHRIBAU, —. 664.84.21
Comment conserver avec toutes leurs qualités les vieilles pommes de terre jusqu'à la prochaine récolte. (How to keep mature potatoes with all their good qualities until the following harvest.) *C.R. Acad. Agric. Fr.*, 1941, 27: 472-6 [received 1947].

Potato tubers keep well if the eyes are removed. A method is described for doing this on a large scale by immersing them for 12 hours in 1½-2½% commercial sulphuric acid. They must be allowed to dry before being stored. A day or two after the treatment a slight depression is seen round each eye, and at the end of a week a plug of cork can be lifted out, on the point of a knife, at each of these spots.

2693. VAN DER WAAL, G. A. 664.84.21
Bewaring van aardappelen in de praktijk. (Storage of potatoes in practice.) *Landbouwk. Tijdschr.*, 1947, 59: 166-9.

Seed potatoes may be kept satisfactorily in glazed stores; more trials are needed on the use of hormones to control sprouting of early seed potatoes. Ware potatoes may be stored in specially built stores more cheaply than in clamps. These stores are built by excavating from 40 to 50 cm. of soil, which is piled up against the side walls, 1.25 m. high; the roof consists of a layer of thatch, 10-15 cm. of flax waste, a layer of reed, and sheets of corrugated iron. Walls and joists may be of wood or concrete; the breadth ranges from 4 m. to 7 m., the larger stores being wide enough to take a cart.

2694. VAN STUIVENBERG, J. H. M. 664.84.21
Verliezen bij het bewaren van consumptie-aardappelen. (Losses in storing ware potatoes.) *Landbouwk. Tijdschr.*, 1947, 59: 151-65, bibl. 38.

A review of work on losses due to respiration, evaporation, rotting, sprouting, and loss of quality, by the formation of sugar or loss of ascorbic acid.

2695. LUTZ, J. M. 664.84.21
Storage of southern-grown potatoes during the summer. *Amer. Potato J.*, 1947, 24: 209-20, bibl. 10.

Storage in sheds or basement at temperatures of 78-81° F. resulted in very high losses. For five months store the best treatment was curing for 4 days at 60° to 80° followed by storage at 40°. Those stored immediately after lifting at 50° also showed fair keeping quality.

2696. COOLEY, J. S. 664.84.22: 632.3/4
Black rot as a storage and market disease of sweet potatoes. *Abstr. in Phytopathology*, 1947, 37: 438.

When black rot is present in the crop at digging time it will continue to develop during storage and in non-cured roots when they are being marketed. Washing non-cured sweet potatoes, with the unavoidable skinning, favours infection and spread of the disease. Less loss will occur when they are sold in a nearby market as soon as dug, but when such a market is not available it is preferable to cure for 10 days immediately after digging, grade out the rots that developed during curing, and market the rest as soon as possible.

2697. PHILLIPS, T. G. 664.84.21: 581.192
Changes in the composition of squash during storage.

Plant Physiol., 1946; 21: 533-41, bibl. 7.

Material: two strains of *Cucurbita maxima*, one of *C. moschata*. Starch is rapidly converted to sugar in storage [conditions not specified]; one-third of the carbohydrate is lost in three months' storage, one-half in six months. The ratio glucose : total sugars increases. In butternut (*C. moschata*) the ratio sucrose : total sugars is very high.—Univ. New Hampshire.

2698. ISAAC, W. E., AND WINCH, N. H. 664.84.65.035.6
The guaiacol-hydrogen peroxide and benzidine-hydrogen peroxide colour reactions of the bean (*Phaseolus vulgaris* L.) pod. *J. Pomol.*, 1947, 23: 23-37, bibl. 14.

The general anatomy of the bean pod is described and illustrated. Fresh bean pod tissue gave no colour reactions with either guaiacol or benzidine in the absence of hydrogen peroxide. When scalded pod slices were immersed, without hydrogen peroxide, in benzidine solution for half an hour the differentiated tissues became slightly blue, but no colour was obtained with guaiacol solution. With fresh and blanched beans three types of colour reaction were obtained. (1) A general colour reaction, destroyed in 3-5 min. at 100° C., of parenchymatous and differentiated tissues with both peroxide indicators. (2) A relatively thermostable brown colour reaction of certain differentiated tissues with guaiacol and hydrogen peroxide. (3) A thermostable benzidine-hydrogen peroxide blue colour reaction of differentiated tissues, obtained with bean slices that had been boiled in water for an hour. The thermostable benzidine-hydrogen peroxide reaction is not due to the presence of a thermostable peroxidase and this reaction is not related to adequacy of blanching; thus for bean pods benzidine is considered unsuitable as a peroxide indicator. Guaiacol is, in general, also unsuitable for testing the adequacy of blanching.—Low Temperature Research Laboratory, Capetown.

2699. CALDWELL, N. E. H. 664.8: 632.6/7
Stored products pests. *Qd agric. J.*, 1947, 64: 265-87.

Section C of this article discusses the pests of dried fruits, nuts and nut foods, section D the pests of stored tobacco, and section G the control of stored products pests in general.

2700.

- a CLARK, C. K., AND STEARNS, C. R. 634.332-1.564
"Puffy" [loose-skinned] tangerines in the packing house process. *Proc. Fla St. hort. Soc.* 1941, pp. 45-52 [received 1947].

- b GROSSENBACHER, J. G. 634.322-1.564
Loose skinned tangerines. *Proc. Fla St. hort. Soc.* 1941, p. 44 [received 1947].
Special methods and standards advocated.

- c JONES, W. W., HOLZMAN, J. J., AND GALLOWAY, A. G. 664.85.651: 632.945
The effect of high-temperature sterilization on the Solo papaya. *Circ. Hawaii Agric. Exp. Stat.* 14, 1939, pp. 8 [received 1947].
For quarantine purposes.

PROCESSING AND PLANT PRODUCTS.

2701. HUGHES, E. B. 664.8
Foods.
Appl. Chem. Repts. 1945, 30: 462-501, bibl. 320.
This review of the literature includes chapters on: Fruit and Vegetables.—Dehydration.—Cool Storage.—Preservation.—Cacao.—Tea.
2702. HEID, J. L., AND BEISEL, C. G. 664.85.3
Citrus products technology.
Proc. Fla. St. hort. Soc. 1946, pp. 31-7, bibl. 33.
An outline of research organization and commercial developments in one of the fastest growing of the food processing industries.
2703. VELDHIJS, M. K. 634.3: 663.813
Citrus fruit products research.
Proc. Fla. St. hort. Soc. 1945, pp. 51-5, bibl. 8.
A brief review and progress report of the chief projects in hand at the U.S. Citrus Products Station, including investigations on concentrated orange juice, peel oil, fatty material in citrus juice, powdered citrus juice, tangerine products, flavour-recovery, and bacteriology.
2704. ANON. 577.16: 634.1/8 + 635.1/8
The ascorbic acid and carotene content of some Australian fruits and vegetables.
J. Coun. sci. industr. Res. Aust., 1947, 20: 1-8.
A paper compiled from data obtained in the laboratories of Commonwealth Food Control and the Council for Scientific and Industrial Research. The data are tabulated for the most part but additional notes are given in the text where the tables do not provide all essential information. There is a note on the procedure followed.
2705. WILBAUX, R. 633.73: 581.192
Note sur la composition chimique des graines de "Coffea eugenioides". (Chemical analysis of seeds of *Coffea eugenioides*.)
Bull. agric. Congo belge (Bruxelles), 1941, 32: 70-3, bibl. 2 [received 1947].
In flavour and size of seed, *Coffea eugenioides* resembles *C. consensis*. Analysis showed the seeds to contain 0.29-0.63% caffeine, 1.75% non-alkaloid N, 16% oil, and 3-5% ash, on a dry weight basis.—I.N.E.A.C.
2706. KIESER, M. E., AND POLLARD, A. 634.11: 577.16
The apple as a source of vitamin C. Tests in 1946.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 132-7, bibl. 5.
In the tests described the cider varieties reached the highest level of vitamin C content, but a few of the culinary and dessert types may approach this. Loss on storage is greater in the early maturing varieties than in those with better keeping qualities. The loss of vitamin C on ripening is more rapid in pears. The vitamin C in cooked apples is about half to two-thirds of that present originally.
2707. BRYAN, J. D. 581.192: 634.1/7
The organic acids of some common fruits.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 138-40, bibl. 4.
The organic acid in plums and apples is almost entirely malic acid; in gooseberries and tomatoes citric and malic acids are present in similar quantities, but in the black currants tested citric acid predominates.
2708. RABOTNOVA, I. L. 577.16
Micro-organisms as reagents for quantitative assaying of vitamins and aminoacids. [Russian.]
Advances in modern biology, 1947, 23: 305-9, bibl. 27.
An account is given of the use of micro-organisms (mostly bacteria, of various genera) as test objects for assaying vitamins, with special reference to the B group vitamins. The method (a cultural one) is described and the organisms to be used for particular vitamins are indicated.
2709. CRANG, A., JAMES, D., AND STURDY, M. 664.84.036.5: 577.16
The retention of ascorbic acid and riboflavin in preserved vegetables.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 145-52, bibl. 2.
Ascorbic acid and riboflavin have been determined on bottled and canned beans, peas and swedes during storage. Considerable loss of ascorbic acid occurred in all vegetables during processing, but thereafter there was little destruction in peas during 20 months storage, but further losses occurred in the sliced beans and diced swedes. The proportion of "reductones" present is small in fresh beans and peas but is about a quarter of the "apparent" ascorbic acid in swedes. After processing, the "reductones" increased, especially in the beans and peas, so that they account for about one-third of the apparent ascorbic acid in the preserved material. The quantity of ascorbic acid left in the beans and swedes reheated after storage was negligible, but the retention in the peas was better. There was some loss of riboflavin in processing the vegetables, and further losses during storage of the peas and swedes, but not of the beans. The different temperatures of processing, and the use of glass as against metal containers had no effect on the ascorbic acid and riboflavin contents of the vegetables, apart from the loss of liquid on processing which occurred in the bottles and not in the cans. [Authors' summary.]
2710. JACQUOT, R., AND ARMAND, Y. 633.491: 613.2
Étude biochimique et physiologique des protéides de pomme de terre. Leur intérêt alimentaire. (The biochemistry and physiology of potato proteins. Their nutritive value.)
C.R. Acad. Agric. Fr., 1942, 28: 595-7 [received 1947].
Potato tubers are an excellent source of nitrogen, both for growth and for maintenance of health. The protein present is far superior to vegetable proteins in general and its nutritive value approaches that of casein.
2711. WOODROOF, J. G., AND OTHERS. 664.85.25
Preparation of peaches for freezing.
Publ. (out of series) Ga exp Stat., 1947, pp. 70, bibl. 64, 60 cents.
Published in co-operation with the Tennessee Valley Authority, this guide recommends a schedule including peeling whole peaches in 7% lye, washing, and rinsing in 2% citric acid before pitting. Before freezing to 0° F., sugar, citric acid and ascorbic acid should be added to the slices to prevent browning.
2712. STAHL, A. L. 664.85.3.037
The freezing preservation of citrus hearts.
Proc. Fla. St. hort. Soc. 1945, pp. 48-50.
Citrus fruits when heated lose their flavour, texture and nutritive value more than do most fruits, therefore means of preserving them, other than canning, have been sought. Freezing is stated to be the ideal method. This paper reports the results of freezing tests carried out over several years.
2713. PERRY, R. L., AND OTHERS. 664.85.047
Fruit dehydration. I. Principles and equipment.
Bull. Calif. agric. Exp. Stat. 698, 1946, pp. 68, bibl. 66.
This bulletin is to be followed by others giving specific directions for the dehydration of cut fruits and of whole fruits. The section on pre-treatment, covering all phases

from harvesting to sulphuring, is followed by a parallel section on the equipment needed for each process, and its layout. The authors define the term *dehydration* as the removal of water from a product under controlled conditions of air flow, temperature, and humidity; and the longest section is devoted to the theoretical consideration of this process. The following equipment is then described:—counter-current, cross-flow, centre-inlet, centre-exhaust (or two-stage), cabinet, conveyor, vacuum, and tunnel dehydrators, drum driers, and the ancillary furnaces and fans.

2714. HILLS, C. H., NEVIN, C. S., AND HELLER, M. E. 664.85.11.047

Firming apple slices.

Fruit Prod. J., 1947, 26: 356-62, bibl. 14.

The authors conclude that all varieties may be firming with calcium chloride; when overripe the use of sodium acetate is also necessary. Slices dipped in calcium chloride solution before canning were at first hardened only superficially, but with prolonged storage the calcium migrated towards their centres; penetration of calcium, and hence internal firmness, was improved by de-aeration in 0.2% calcium chloride.

2715. BROOKS, G. 664.85-711.047

Bananes séchés. Étude biochimique et technologique. (Study of the biochemistry and technique of drying bananas.)

Jouve et Cie, Paris, cited in *Bull. agric. Congo belge*, 1947, 38: 455.

Sugar, vitamins A, B₁, B₆ and C, and proteins remain intact when bananas containing 5 to 10% sugar are heated to 50 or 60 [° C. ?]; the loss in weight is 66%, representing a considerable saving in transport. Four drying plants are in operation in the Cameroons.

2716. BOISCHOT, P. 664.84.21.047

Conservation des pommes de terre par dessiccation. (Preservation of potatoes by drying.) *C.R. Acad. Agric. Fr.*, 1942, 28: 568-70 [received 1947].

A method of treating potato slices with dilute sulphuric acid before drying them, in order to prevent oxidation, is described.

2717. ADAM, W. B. 664.85.036.5 + 664.84.036.5

Inspection of canned fruit and vegetables for quality.

A.R. Fruit Pres. Res. Stat. Campden 1946, 1947, pp. 13-20.

The author notes the voluntary National Mark Scheme which operated in the years 1930-1939. At the end of the war the improvement of quality remained the chief feature needing attention and the author suggests how this can best be achieved and describes briefly the scheme of inspection and grading canned fruit and vegetables which has tentatively been adopted by the industry. The scheme came into operation in the summer of 1946. Over 5,000 cans were examined in the first 7 months. A report of the first year's operation is not yet available, but there is reason to suppose that the scheme will improve the quality of British produce (1) by showing canners the relative merit of their packs compared with those of other canners, and (2) by acting as a basis for quality standards which will eventually be recognized generally.

2718. GILLESPIE, T. G. 664.8.036.5: 632.3

The heat resistance of the spores of thermophilic bacteria.

A.R. Fruit Pres. Res. Stat. Campden 1946, 1947, pp. 40-51, bibl. 2.

The meaning and implications of the terms *thermal death rate* and *temperature coefficient* as applied to the destruction of bacterial spores by moist heat are discussed, with illustrations from laboratory results obtained with a strain of thermophilic anaerobe. [Author's summary.]

2719. GILLESPIE, T. G. 664.85.036.5: 632.4

Studies on the mould *Byssoschlamys fulva* IV.

A.R. Fruit Pres. Res. Stat. Campden 1946, 1947, pp. 31-9, bibl. 4.

1. The heat resistance of the ascospores of *B. fulva* has been reviewed with reference to the processing of canned and bottled fruit. 2. The effect of sulphur dioxide on ascospores has been reviewed and some new work reported which shows that the lethal concentration is a function of the hydrogen-ion concentration of the medium and that non-ionized sulphurous acid is probably the lethal factor. [Author's summary.]

2720. DICKINSON, D. 664.8.036.5

The internal corrosion of cans. Final report.

A.R. Fruit Pres. Res. Stat. Campden 1946, 1947, pp. 21-30, bibl. 4.

In this series of papers concluded here the corrodibility of the steel base plate and the corrosivity of the can contents have received considerable attention and much light has been thrown on methods of solving the many problems involved. Electrolytic and polarographic experiments are here discussed.

2721. ESSELEN, W. B., Jr., HART, W. J., Jr., AND

FELLERS, C. R. 664.85.11

Further studies on the use of calcium chloride to maintain firmness in canned and frozen apples.

Fruit Prod. J., 1947, 27: 8-13, bibl. 13.

Forty-eight varieties responded to calcium chloride treatment, when applied after a short period of cold storage. The treatment is more effective at a pH of 2.7 to 2.9, and may be combined with dips to prevent browning.—Univ. Mass.

2722. FLANZY, M. 663.25

L'indice de tartre dans les vins. Signification météorique. (The significance of weather conditions for the tartar index in wines.)

Ann. Agron. Paris, 1946, 16: 341-51, bibl. 33.

From a large body of data the author concludes that no evidence exists of the significance of weather conditions for the tartar index of wines. The tartar index expresses the ratio tartaric acid : potassium.—Stations de Recherches Viticoles et Oenologiques de Narbonne.

2723. GALLAY, R., AND FLEURY, C. 663.255.33

Sulfitage des moûts et fermentation malo-lactique des vins. (Sulphiting musts and the malo-lactic fermentation of wines.)

Publ. Stat. féd. Ess. vitic. arboric. Lausanne, 1946, 347, pp. 11.

The concentration of sulphurous acid, to inhibit lactic fermentation in musts for white wines, should not exceed 100 mg. per litre.

2724. WARCOLLIER, —. 663.3: 634.11

Utilisation de la récolte de pommes à cidre et des sous-produits de la fabrication du cidre. (Cider apples and by-products of the cider industry.)

C.R. Acad. Agric. Fr., 1940, 26: 842-52 [received 1947].

A review of the products of the cider industry and their uses. Reference is made to the extraction of pectin from pomace, and the use of the pips of apples and pears as seeds for raising free rootstocks for commercial varieties.

2725. BURROUGHS, L. F. 663.3 + 663.813

The determination of the titratable acidity of apple juice and cider.

A.R. Long Ashton Res. Stat. 1946, 1947, pp. 127-32.

A new modification for the determination of the titratable acidity of cider makes use of a mixed indicator of bromothymol blue and phenol red. Its main advantage is a sharp and easily recognizable end-point.

2726. CRANG, A., JAMES, D., AND STURDY, M. 663.813: 634.11

Progress report on domestic apple juice production.
A.R. Long Ashton Res. Stat. 1946, 1947, pp. 140-4.

In attempts to prevent a deposit in apple juice by stabilizing or breaking down the colloidal system in the juice before storage, a method of using a depectinizing enzyme at a moderately high temperature, followed by a filter aid is promising and is being further investigated.

2727. GRIFFIN, E. L., TALLEY, F. B., AND HELLER, M. E. 663.813: 634.11

Comparison of the essences from nine varieties of apples.

Fruit Prod. J., 1947, 27: 4-5, bibl. 1.

The essences, which differed considerably, were tested in reconstituted apple juice, apple candy, and apple jelly. Only the last was acceptable without essence, and all were improved by the addition of essence, preferably a blend of several varieties.—Eastern Regional Research Lab., Philadelphia.

2728. VOLLAIRE-SALVA, J. 663.813: 634.31

Conservation de la vitamin C naturelle du fruit dans les jus d'orange fabriqués en France.
(Conservation of natural vitamin C in orange juice processed in France.)

Fruits d'Outre-Mer, 1947, 2: 43-4, bibl. 7.

Good retention for at least three months followed vacuum de-aeration of orange juice in stainless steel vessels; the juice was bottled under vacuum and then pasteurized.

2729. ROSS, E. 577.16: 634.31 + 634.323

The vitamin C, solids and acid in orange and grapefruit juices used for canning purposes.

Proc. Fla St. hort. Soc. 1941, pp. 56-60, bibl. 6 [received 1947].

The data presented show seasonal levels and intra-seasonal trends of vitamin C, total soluble solids and total acid. The association in orange juice of high vitamin C content with high acidity and low vitamin C with low acidity is discussed.

2730. CARLETON, R. T., AND CLOUD, H. R. 663.813: 634.31

Dehydrated orange juice.

Proc. Fla St. hort. Soc. 1945, pp. 55-8.

An account of a high-vacuum, low temperature process for dehydrating orange juice and an evaluation of its future success.

2731. HAYES, N. V., COTTON, R. H., AND ROY, W. R. 663.813: 634.31

Problems in the dehydration of orange juice.

Proc. Fla St. hort. Soc. 1946, pp. 26-31, bibl. 12.

A discussion on the dehydration process and a description, with data, of some of the problems involved.

2732. CURL, A. L., AND VELDHIJS, M. K. 663.813: 634.31

The origin of the off-flavour which develops in processed orange juice.

Fruit Prod. J., 1947, 26: 329-31, bibl. 9.

Most of the off-flavour is due to the suspended material, which includes the lipid fraction; filtered juices, stored at 80° F., developed some off-flavour of a different nature [see also *H.A.*, 16: 2276].

2733. SINCLAIR, W. B., AND ENY, D. M. 663.813: 634.3

Stability of the buffer system of lemon juice.

Plant Physiol., 1946, 21: 522-32, bibl. 14, being *Pap. Calif. Citrus Exp. Stat.* 541.

Continuing earlier studies [*H.A.*, 16: 2279], the authors followed the behaviour of the buffer system of lemon juice

and of citric acid-citrate solutions of equivalent concentrations; these behaved in a similar manner. In lemon juice the system was efficient over $\text{pH} = \text{pK}_a \pm 1.8$, with a maximum at pH 4.4. 10 m.e. of KCl or NaCl per ml. juice failed to change the pH ; with K_2SO_4 and KNO_3 increases of 0.18 and 0.19 were recorded. Sucrose, up to 50% by weight, did not change the pH . The buffering capacity is not affected by boiling the juice.

2734. AXELROD, B. 634.3: 581.192

Citrus fruit phosphatase.

J. biol. Chem., 1947, 167: 57-72, bibl. 25, being *Contr. Enzyme Res. Lab., Albany, Calif.* 102.

1. Citrus fruits (Navel and Valencia oranges, Eureka lemons, and Marsh Seedless grapefruit) contain an enzyme system capable of hydrolyzing a variety of phosphate compounds. 2. The relative concentration of the enzymes in various tissues of these fruits has been determined. Some activity is in solution in the juice. This is the first reported instance of an enzyme actually present in citrus juice. 3. Some concentration of the Navel orange juice phosphatase has been achieved. 4. Orange juice phosphatase possesses phosphomonoesterase activity but no diphenylphosphatase activity. It can also hydrolyze various polyphosphates, including $\text{Na}_2\text{P}_2\text{O}_7$, whose enzymatic hydrolysis has not been previously reported. 5. The energy of activation for nitrophenyl phosphate hydrolysis has been determined. 6. The pH optimum for cleavage of nitrophenyl phosphate, α -glycerophosphate, and β -glycerophosphate has been determined. 7. The stability of this enzyme at various pH levels has been ascertained. [Author's summary.]

2735. CRANG, A., AND STURDY, M. 663.813: 635.64

A comparison of five methods of making tomato juice [in the home].

A.R. Long Ashton Res. Stat. 1946, 1947, pp. 156-7, bibl. 1.

All methods described gave satisfactory products; that recommended by the Ministry of Agriculture in its *Bulletin* 21 resulting in the highest retention of ascorbic acid, the highest yield of juice and the most palatable product.

2736. FLANZY, —. 634.8-1.57

Pépins de raisins et extraction de l'huile. (The extraction of oil from grape seeds.)

C.R. Acad. Agric. Fr., 1942, 28: 652.4 [received 1947].

The data emphasize certain facts essential for the successful exploitation of the extraction of oil from grape seeds: (1) the possibility of ensiling the fresh seeds without preliminary drying, (2) increasing the oil during the storage of the seeds while still preserving the initial qualities of the oil.

2737. ARNOULD, L. 634.51-1.57

Sur l'huile de noix d'Amérique (*Juglans nigra*). (Black walnut oil.)

C.R. Acad. Agric. Fr., 1941, 27: 209-13 [received 1947].

The extraction of oil from the kernels of nuts obtained from a black walnut tree in France is recorded. 5.3 kg. of kernels yielded 24 litres of good yellow oil suitable in every way as a salad oil. The yield of oil approaches that of the ordinary walnut which is about 1 litre from 2 kg. kernels.

2738. LENOLEN, —. 634.51-1.57

Contribution à l'étude de l'approvisionnement en corps gras (huile de noix et graisses animales).

(Stocks of oils (walnut oil and animal oils).)

C.R. Acad. Agric. Fr., 1940, 26: 739-45 [received 1947].

This article is concerned chiefly with the exploitation of walnuts for their oil. 100 kilos of walnuts yield 40 kilos of kernels, the oil accounting for about half this weight.

2739. ROUSSEAU, P. M. 634.63:665.327.3
L'huile d'olive Tunisienne: extraction de l'huile d'olive par pression. (Tunisian olive-oil: the extraction of oil under pressure.) *Oléagineux*, 1947, 2: 405-17.
- After reviewing olive-oil production in Tunis the author describes the ancient process of pressing in esparto grass baskets and then proceeds to give an account of the extraction process as carried out by machinery. Advice is given on the control of the manufacturing process and on the general upkeep of oil-mills.
2740. VANNECK, C. 634.6-1.56
Quelques considérations sur l'extraction de l'huile de palme. (Remarks on the extraction of palm oil.) *Bull. agric. Congo belge*, 1947, 38: 75-102, bibl. 31.
- The essential part of all processes is the preparation by cooking or malaxation of the fruit; this must break the emulsion in the fruit—either by inversion or drying—and rupture the oil cells. Variations in losses in the centrifuge are largely due to faulty preparation, which may, however, be corrected by rapid boiling. The "wet process" is particularly useful for fruit decorticated before sterilization, provided that this is done slowly enough to invert the emulsion; but a low oil content in the residue is not a criterion either of good preparation or of efficient extraction with this method.
2741. VANNECK, C. 634.6-1.56
La production industrielle d'huile de palme de faible acidité. (Large scale production of palm oil of low acidity.) *Bull. agric. Congo belge*, 1947, 38: 103-20, bibl. 15.
- From experiments in the laboratory and in the mill at Yangambi, the author concludes that any mill can produce palm oil of 0.3 to 1% free fatty acids, provided that the fruit is sterilized either on the bunch, or within one minute of stripping, a temperature above 45° C. being sufficient to check the action of enzymes. Whenever the mill is stopped, equipment should be cleaned thoroughly to destroy various micro-organisms, abundant in oil mills, that secrete lipolytic enzymes. For the same reason, air should be sterilized before entering oil storage tanks.
2742. ANON. 634.6+633.85
Développement de la production de matières grasses d'origine végétale dans les territoires d'outre-mer. (Overseas development of the production of vegetable fats.) *Oléagineux*, 1946, 1: 140-8, 196-204.
- These two articles, which are extracts from the report of the Sous-Commission d'Agriculture Coloniale du Commissariat Général du Plan, include sections on the development of the oil-palm, karité (*Butyrospermum parkii*), coconut, castor and tung (*Aleurites montana* and *A. fordii*). Figures are given showing pre-war production and that of 1945. An estimate is given of the quantity of vegetable oils likely to be available for export from French overseas territories in 10 years time.
2743. SCHÄR, E. 633.74-1.57
Edible fats from cocoa-beans. [Translated title.] *Trav. Chim. Alim. Hyg.*, 1947, 38, abstracted in *Food*, 1947, 16: 292.
- In Switzerland in 1943 cocoa-butter was prepared commercially not only by the usual chocolate method but also by extraction. This was added to margarine at up to 25%, after refining. If the residue is to be used for food, it should contain at least 10% fat.
2744. GRANT, E. P. 634.11-1.576
Apple by-products. *A.R. Pomol. Fruit Growing Soc. Prov. Quebec* 1946, pp. 40-4.
- The various processes involved in preparing the following are briefly described and discussed: dried, canned and frozen apples, cider vinegar and apple juice. Other apple products mentioned are: pie filler, sauces, juice concentrate, bland syrup, apple-butter and apple-candy.
2745. MOFFETT, J. P. 634.651-1.57
Papain production in Northern Tanganyika. *Crown Colon.*, 1947, 17: 574, 576.
- The cultivation of the papaw, the tapping of its fruit, and the preparation of papain from the latex are briefly described. Yields per acre are given as 60-100 lb. of papain, now worth 25 shillings per lb. There are three photographs.
2746. MARTIN, J. B. 633.494:663.52
Le topinambour source d'alcool. (The Jerusalem artichoke as a source of alcohol.) *C.R. Acad. Agric. Fr.*, 1941, 27: 146-50 [received 1947].
- The inulin in the tubers of the Jerusalem artichoke [*Helianthus tuberosus*] can be transformed by fermentation into alcohol. 100 kg. of tubers yield 9 to 9.5 litres of alcohol of good quality. The extended cultivation in France of the artichoke for this purpose is suggested.
2747. BLANC, A. 633.494:663.52
Résultats d'essais de distillation du topinambour. (Alcohol from the Jerusalem artichoke.) *C.R. Acad. Agric. Fr.*, 1941, 27: 380-7 [received 1947].
- Describes a trial in which 367 hectolitres of pure alcohol were obtained from 460 (metric) tons of Jerusalem artichoke tubers, or 79.8 litres per ton. The red variety gave 82 litres per ton, the yellow and white varieties together only 75 litres.
2748. ADAM, W. B., AND DICKINSON, D. 664.84.656.036.5
The dry solids and sugar content of processed peas. *A.R. Fruit Pres. Res. Stat. Campden* 1946, 1947, pp. 52-7.
- The average sugar content of 41 samples of canned peas was 2.00% estimated as sucrose; the range was 1.70 to 2.40%. The average dry solids content was 22 to 24% according to size of can and variety of pea.
2749. RAMÍREZ, J. H. 634.771-1.57
La manufactura de la harina de plátano. (Plantain flour.) *Rev. Inst. Def. Café Costa Rica*, 1947, 17: 462-9.
- The author's process is described: plantain fruits (*Musa paradisiaca*) are immersed in hot water (170° F.) for 5 minutes, peeled and sliced thinly with a stainless steel knife; the slices are then soaked in a solution of 1 part of common salt (NaCl) in from 1 to 3 parts of water, depending on the initial tannin content, until this is sufficiently reduced [see *Rev. Agric. Puerto Rico*, 35: 234]; the slices are then dried under a vacuum at 80° C. until they are dry enough to go through a ball mill.—Rio Piedras, Puerto Rico.
2750. MOREAU, L., AND VINET, E. 635.1/7: 577.16
Sur la préparation et la conservation des extraits de légumes. (The preparation and preservation of vegetable extracts.) *C.R. Acad. Agric. Fr.*, 1940, 26: 785-8 [received 1947].
- Describes the preparation and preservation of vitamin-containing juices from various vegetables and weeds, particularly from those parts which would commonly be discarded, e.g. the leaves and stumps of cabbages, cauliflowers and brussels sprouts, the leaves of carrots and turnips, etc.
2751. CRANG, A., JAMES, D., AND STURDY, M. 664.84.63.036.5
A note on bottled cucumbers. *A.R. Long Ashton Res. Stat.* 1946, 1947, p. 152.

An acceptable product with pH 4.0 or under was obtained by packing whole cucumbers with 5% vinegar diluted 1 part in 5 parts of brine, using sufficient acid brine to cover the cucumbers when originally packed, and boiling for 1½ hours.

2752. CRUESS, W. V., KILBUCK, J. H., and HAHL, E. 634.55-1.57

Utilization of almond hulls.

Fruit Prod. J., 1947, 26: 363-65, bibl. 5.

In California almond hulls are largely fed to livestock although low in protein content. They contain 4.5% tannin of good quality and of possible commercial value. Syrup may be made from the hulls, which contain 25% sugars.—Univ. of Calif.

2753. BECKER, R. B., and OTHERS. 664.1.031: 634.3 Citrus molasses.

Press Bull. Fla agric. Exp. Stat. 623, 1946, p. 2.

The press juice from treated citrus pulp contains approx. 6% of fruit solids, mainly sugars. When evaporated under partial vacuum to approx. one-thirteenth of its volume (about 70% solids) the product is known as citrus molasses. This consists mostly of reducing and non-reducing sugars and 3 to 5% each of crude protein and ash. Citrus molasses is a sweet, brownish-yellow syrup with a characteristic bitter after-taste due to the concentrated naringin present. A process has been developed which modifies this flavour. There is a potential production of 1 ton of molasses per 2 tons of dried citrus pulp. Short notes are given of its estimated feeding value.

2754. CRANG, A., and STURDY, M. 664.84.035.4 The keeping quality of chutneys. *A.R. Long Ashton Res. Stat.* 1946, 1947, pp. 153-5.

Mould developed only on chutneys which had an acidity below 1% and had been inoculated with mould spores. None of the uninoculated jars grew moulds, showing that even with a low acidity, chutneys sealed at once with vinegar-proof paper in clean jars will withstand poor storage conditions. The practice of leaving chutney in the jars open to the air for 24 hours before sealing is to be deprecated.

2755. LI, L. P., and BONNER, J. 633.72: 581.192 Experiments on the localization and nature of tea oxidase. *Biochem. J.*, 1947, 41: 105-10, bibl. 27.

Tea oxidase, which is the enzyme responsible for the oxidation of the tea tannins and the fermentation of black tea, resembles polyphenol oxidase; unlike the latter, however, it does not occur in the cytoplasm but solely in the chloroplasts, where the enzyme is closely associated with the structure of the grana, not with the chlorophyll. It does not appear to be involved in the respiration process.—Tea Station, Meitan, Kweichow, China, and Pasadena, Calif.

2756. EVERS, H. H. 633.71-1.56 Curing and fermentation of tobacco. *Chem. Industr.*, 1947, No. 28, pp. 423-5, bibl. 10.

Although something is known about the changes in composition which take place in tobacco during curing and fermentation, less is known of the actual mechanism whereby these changes are brought about. The author gives an account of the microbiological agencies concerned in the curing and fermentation processes, at the same time emphasizing that their precise role is by no means fully understood.

2757. MATTHEWS, E. M., MCVICKAR, M. H., and DAVIS, R. B. 633.71-1.56 Curing bright tobacco with coal and oil.

Bull. Va agric. Exp. Stat. 396, 1946, pp. 8.

Comparisons of curing bright leaf tobacco with coal and oil are presented. Both systems are satisfactory and cheaper to operate than wood under present price conditions. The Matthews-Bell stoker system was more economical to operate than the oil-burner system. The features of the

Matthews-Bell system—outside furnace, flat top furnace, double opening from furnace to flues, variable flue rise and flue arrangement—are practical and recommended. The oil-burner is recommended where electricity is not available. [Authors' summary.]

2758. BROWN, D. D. 633.71-1.56 Tobacco culture in Southern Rhodesia. Harvesting and curing Virginia type tobacco. *Rhod. agric. J.*, 1947, 44: 31-44.

A practical article including instructions for air, sun fire- and flue-curing.

2759. PROKOFIEV, A. A. 581.192: 633.912/913 The plastid origin of rubber. [Russian.] *J. Bot. U.R.S.S.*, 1946, 31: 2: 5-9.

The structure of latex globules from *Hevea*, *tau saghyz*, *kok saghyz*, and other rubber-bearing plants, was microchemically examined. It was found that as the globules increased in size, their structure became differentiated, the outermost layer consisting of a protein substance. The plastids of the latex vessels are believed to participate in the formation of the globules; and as they become older their formative influences vary accordingly.

2760. a BOUTARIC, M. 634.972.7: 633.85 L'huile de graines de tilleul. (Lime seed oil [*Tilia* spp.]) *C.R. Acad. Agric. Fr.*, 1943, 29: 127 [received 1946].

- b DE LA BOUTEILLIÈRE, —. 633.491: 663.52 La pomme de terre source d'alcool. (The potato as a source of alcohol.) *C.R. Acad. Agric. Fr.*, 1944, 30: 300-2 [received 1947].

- c CANADA DEPARTMENT OF AGRICULTURE. 664.84.032 + 664.85.032 Home canning of fruits and vegetables. *Publ. Dep. Agric., Canada*, 789, 1947, pp. 32, being *Consumer Bull.* 1.

- d CASS, W. G. 663.3 Cider manufacture in France. *Food*, 1947, 16: 271-2, bibl. 22.

- e GUITTONNEAU, G., and OTHERS. 663.3 Sur une étude microbiologique des cidres normands et sur les enseignements industriels qui en découlent. (The commercial microbiology of Normandy ciders and its commercial significance.) *C.R. Acad. Agric. Fr.*, 1942, 28: 563-7 [received 1947].

- f LÜTHI, H. 663.813 Versuche zur Verbesserung der Luftfilter. (The improvement of air filters in fruit juice containers.) *Schweiz. Z. Obst- u. Weinb.*, 1947, 56: 41-5.

- g MATTSOON, S. 635.656: 613.2 The cookability of yellow peas. A colloidal-chemical and biochemical study. *Acta Agric. suecana*, 1946, 2: 185-231, bibl. 32.

- h MAYADAS, P. 633.524.3-1.57 Preserved products from the Rozelle [*Hibiscus sabdariffa*]. *Punjab Fruit J.*, 1947, 11: 169-70. Instructions for making three preserves.

- i NÈGRE, E. 663.825 Conseils pour la vinification. (Advice on wine production.) *Prog. agric. vitic.*, 1947, 128: 35-52.

- j ROBBINS, P. W. 633.64-1.56
The cost of making maple sirup.
Quart. Bull. Mich. agric. Exp. Stat., 1947, 29:
188-9.
- k ROEHRICH, O., AND BUI-XUÂN-NHUÂN. 633.525.1
La fibre de ramie, sa préparation, sa filature et
ses utilisations industrielles. (Preparation, spin-
ning and industrial uses of ramie fibre.)
Agron. trop., 1946, 1: 593-616, bibl. 13.

- l STEUART, D. W. 663.813: 634.11
The nitrogen content of apple juice and its
importance in cider making.
Chem. Industr., 1947, 66: 55-6.
- m ZWEDE, A. K. 664.84.037
Eenige vraagstukken rondom het snelvriezen
van tuinbouwproducten. (Some problems in
the quick freezing of horticultural crops.)
Landbouwk. Tijdschr., 1947, 59: 135-50, bibl.
22.

NOTES ON BOOKS AND REPORTS.

2761. BUSH, R. 634.1/8 + 664.85
Harvesting and storing garden fruit.
Faber & Faber, London, 1947, pp. 162, 16 page
pl., bibl. in text, 12s. 6d.

And, one might add, hints to ensure there is some fruit to harvest.

This book, as its title implies, is not for the professional grower but for the man who grows fruit in his garden in England on a scale that demands attention to its bestowing and keeping.

First the author indicates the great effect of local climate on time of ripening and stresses the necessity for bearing this in mind. Next he notes how essential to a good crop are spacing, manuring, thinning and other cultural practices, dealing in turn with apples, pears and other fruits. He then gives approximate dates on which picking should normally begin, in an area south of the Thames and no farther west than Somerset, of different varieties of particular kinds of fruit with a note on outdoor grapes.

He proceeds to consider the various ways in which fruit can be stored satisfactorily in underground or ground level store, in shed or larder, with or without the aid of wraps, dips or sprays. He pays considerable attention to quick freeze methods of preservation and to canning and bottling, and the use of preservative solution, but has little favourable to say of dehydration. He finally discusses fruit wines and juices and their manufacture, giving extremely brief outlines of the processes involved. He has no illusions as to the availability in times of austerity of the building materials necessary for stores, of electricity for quick freeze methods, or of sugar for wine production, but he looks for "a new civilization to rise again from our ruins and frustrations" when "such commodities will again be household words. Till then ideals cost nothing and are pleasant things to cherish".

And this, incidentally, is a pleasant book for the winter evening when you are making New Year resolutions.

2762. CIFERRI, R. 581.6
La sistematica delle piante. Tomo 1. Parte
generale. (Plant systematics, Vol. 1. General.)
Botanica Agraria, Vol. 3, Hoepli, Milan, 1946,
pp. 337.

In the two first sections of this book, pp. 1-32, bibl. 128, the author defines and discusses the terms systematics, classification, taxonomy and identification as applied to plants. In the third section, pp. 33-194, he discusses in considerable detail with maps, photographs and diagrams, the evolution of plants naturally and with the help or by the intervention of man. He pays considerable attention to geographical origin, dealing with a number of plants now cultivated in different forms such as olive, coffee, etc., and showing how ethnological, botanical, archaeological and philological studies are intimately connected with one another. In section 4 (pp. 195-206) he considers the method of classifying cultivated plants and in section 5 he lists, according to their geographical centre of origin, a large number of the most important cultivated plants, grouping them as cereal, horticultural, fruit, sugar, fibre plants, etc. The geographical centres are China, India, Indo Malay, Middle Asia, Near

East (Asia anteriore), Mediterranean, Ethiopia, S. Mexico and Central America, South America, Chile and Brazil. There are subject and author indexes and a list of over 560 references to works relevant to sections 2-4.

2763. CORMEAU, P. 634.1/8(675)
L'arboriculture fruitière au Katanga. (Fruit-growing in Katanga (Belgian Congo).)
Comité Spécial du Katanga, Imprimerie Imbelco,
Elisabethville, 1946, pp. 173, bibl. 29.

In this book, which is of a popular nature, the author sets out to condense all the knowledge of fruit growing which he has acquired in Katanga to date. The first part deals with general principles, the second with the chief tropical and sub-tropical fruits and the last section with temperate-region fruits. The book covers 53 kinds of fruit, most of which are necessarily dealt with very briefly, though citrus, apples and peaches are discussed at some length. With regard to the two last-named, it is interesting to note that no mention is made of delayed foliation, a common phenomenon in apples and peaches grown in tropical and other regions where winters are mild.

2764. FAULKNER, R. P. 635.1/7 + 635.9
Commercial horticulture in greenhouse and nursery.
C. Arthur Pearson, London, 1947, pp. 172, 6s.

The author offers this small, useful book both as a guide and as a warning to the would-be nurseryman; in England its appearance is opportune, for many now being demobilized look to the land for their living. The arrangement of the nursery, buildings, greenhouses and heating apparatus, are discussed in general terms, with frequent reference to a particular establishment. Much of the book is devoted to the vegetable and flower crops that can profitably be grown on a small scale; one acre is suggested as a suitable beginning, budgeting for a capital of £2,000 and an annual profit of 20%. There are chapters on cloche cultivation, business-getting methods, and finance. Although the scope of the book precludes mention of fruit-setting sprays for tomatoes (now nationally advertised and in commercial use), the reader finding his vocation in nursery work is urged to consult the oracles—the N.F.U., the N.A.A.S. and the annual reports of the appropriate research stations—on such topics. Slight arithmetical discrepancies on page 43, in the excellent section on heating, are offset by the sound advice to provide twice as much heating capacity as is theoretically required.

2765. GRIFFITHS, E. 536.5 + 551.52
Methods of measuring temperature.
Ch. Griffin & Co. Ltd., London, 3rd edition,
1947, pp. 223, text figures 91, tables 56, 20s.

The appearance of Dr. Griffiths' book in its third and revised edition will be welcomed by all those concerned with temperature measurements. The biologist will find that temperature ranges far beyond his normal interests are covered by this book, but the fundamental principles set out are of equal importance, whatever the range. The author has paid special attention to the experimental basis of the methods in general use, the calibration of the instruments, and the precautions which must be observed in

practice. The thermo-electrical methods for measuring temperature have become more and more commonly used in biological research, and the chapters on resistance thermometers and thermocouples are therefore of special interest. The description and instructions for use of the different types of indicators and the clear illustrations of these, will be extremely valuable. It is worth mentioning that the potentiometer method is recommended for thermocouple measurements, if a closer accuracy than $\pm 5^{\circ}$ C. is desired. J.T.

2766. JACKMAN, G. R., AND BUSH, F. A.
635.976 + 635.977
Shrubs and trees for everyman's garden.
Garden Publications, London, 1947, pp. 186,
25 plates and 41 figs., 7s. 6d.

Everyman has had a pretty thin time during the past few years, but, although we are still asked to grow more food, things are looking up; we now have town and country planning, and with all the new building there is great scope for planting trees and shrubs. An historical introduction is followed by chapters devoted to soils, propagation, planting, pruning, etc. Some 60 pages are concerned with shrubs and trees for various purposes and different seasons, and the index of about 500 items mainly refers to this section. The useful and authoritative information in these pages should certainly stimulate the average reader to plant some of the more beautiful species now available in this country.

2767. JOUIS, E., LE GRAVEREND, E., AND RÉGNIER, R.
634.1/2(44)
Les vergers de grand rendement. (The cultivation
of top fruits, apples, pears, plums and cherries.)
La Maison Rustique, 26 Rue Jacob, Paris (VIe),
1946, pp. 404, 400 fr.

This work of prominent authorities in the Seine-Inférieure is not a complete treatise on French fruit growing, since the details of certain aspects of it, e.g. pruning, are omitted. It does not claim to do more than give pointers to the best methods of planting and cultivating an orchard to ensure maximum returns with minimum risk and thereby prepare the way for that research on which future fruit growing depends. In part I soil and climate, types of orchard (intensive and others), layout and actual planting and renovation of old orchards are considered. In part II soil improvement by the addition of organic matter, lime, sterilization, etc., is discussed and this is followed by 5 chapters on the nutrition and actual manuring of fruit trees. Considerable tabular information is given on the actual nutrient constituents of different organic and inorganic manurial substances and of how to preserve a suitable equilibrium between the amounts of major nutrients. The use of the fertilizer lance is described at some length. In part III cultivation of each of the 4 fruit species is dealt with in turn, and in each case selection of varieties and rootstocks is considered carefully, attention being paid to the purpose for which the fruit is being grown, to pollination problems, etc. Part IV shows how varieties should be placed in the plantation according to the type of orchard. Part V—some 140 pages—is devoted to plant protection. Pleasing features of the book include the following:—a very large number of text illustrations, which both lighten the text and help to explain the points made; notes on the different government and other services which the grower has at his disposal and a list of important publications dealing with special aspects of fruit growing. Throughout it is obvious that the authors' aim is to add the benefits of exact science to the incomparable climatic advantages already possessed by France.

2768. McMILLAN, R. C., (AND CAITHNESS, A. J.*)
634/635(411)

Planting for plenty.
Faber & Faber, London, 1947, pp. 112, 49 pl.,
8s. 6d.

* Responsible for the excellent plates.

This is a weekly diary of gardening duties very clearly and usefully illustrated. It is written by an expert with knowledge of an amateur's difficulties, primarily for the Scottish gardener, though its appeal will be much wider.

2769. MASSIBOT, J. A. 631.52 + 519.63
*La technique des essais culturaux et des études
d'écologie agricole.* (The technique of cultural
trials and studies in agricultural ecology.)
Éditions Georges Frère, Tourcoing, 1947,
pp. 737, 1,250 French francs.

The English-speaking nations have been mainly responsible for the recent rapid development of statistical methods, and it is their empirical spirit that permeates the subject. This book on experimentation by a Frenchman is, therefore, a novelty, but one that gives hope that the systematizing genius of France will contribute to the developments of the future. Monsieur Massibot writes for French research workers at home and overseas who cannot consult the many papers that have been written on statistics in numerous foreign journals and endeavours to include in one volume in French the essentials of all branches of agricultural experimentation. Two-thirds of his massive work deal with statistics, the rest with biochemistry and ecology; and, in the main, all is very well done.

But, where so much is attempted the result must, to some extent, be patchy, for the field is too wide for one author—or, indeed, for one reviewer. Thus, in discussing the interpretation of incomplete data, the unencouraging preliminary statement (p. 205) that all results must be of dubious validity might well have been omitted, had the author merely explained how to correct for non-orthogonality. Again, the normality of variates cannot always be assumed (pp. 49, 153), while the basic postulate in the theory of field trials is not that the differences between treatments are always proportionately the same, but that they are absolutely so (p. 167). Also, some mention should have been made of the method of Papadakis for eliminating soil variability, and of the diagnosis of mineral deficiencies by injection methods. The most important defect, however, is the insufficient emphasis on the problems peculiar to perennial plants, while the recommendation (p. 442) to use quasi-factorial designs for comparing varieties of woody species is most rash. Yet such blemishes are not fundamental, and though the experimenter who follows Monsieur Massibot's instructions may not always go by the best route, he will almost certainly arrive at his destination.

For French readers, then, this book should be invaluable, but for workers who can read and have access to the wealth of publications in English, better accounts are to be found, either in books or in the admirable Technical Communications of the various Imperial Bureaux, on almost any one of the subjects dealt with by the author.

In the relationships between these many subjects the author is clear and sensible and discusses matters that are very little written about. Too many workers understand how to conduct a manurial field trial, how to diagnose deficiencies from leaf samples, how to carry out a fertilizer investigation in pots and much else, without being clear how far these various approaches are complementary and how far one supersedes another. In this respect, the very comprehensiveness of this book, which is the cause of its blemishes, is also its greatest merit. S.C.P.

2770. ROBERT, P. 634.3(65)
Les agrumes dans le monde. (Citrus fruits
throughout the world.)
Institut des Fruits et Agrumes Coloniaux, Paris,
1947, pp. 555, bibl. 8 pp., Fr. 600.

This ambitious and, by modern standards, over-long book attempts to cover an immense amount of ground. The author is obviously much more interested in trade in citrus than in technicalities of citrus cultivation or in citrus types.

The first 150 pages are devoted to a general review of the production, trade and consumption of citrus fruit throughout the world. This is followed by a lengthy account of the citrus industries in the U.S.A. and Spain, the section on the Californian industry being of particular interest. The author then turns homewards and tells of the development of citrus consumption in France, beginning with the first importation at the end of the fifteenth, or beginning of the sixteenth, century. The fourth, and one must suppose the most important, section of the book in the author's mind, is devoted to the development of citrus growing in Algeria, a country to which M. Robert is obviously deeply attached. Although the Algerian citrus industry now holds but a modest place in the list of citrus-producing countries, one is left with the impression that, given the co-operation of growers and sympathetic understanding on the part of the authorities, the future prospects for the industry are bright. The book contains hundreds of footnotes, 117 tables (none later than 1941), a rather disappointing bibliography and a subject and author index. The inclusion of *Horticultural Abstracts* among the list of U.S.A. publications dealing with citrus growing and the omission of some well-known publications from the list slightly shakes our faith in the author.

2771. ROYAL HORTICULTURAL SOCIETY. 635.939.124
Rhododendron handbook.
Royal Horticultural Society, London, 1947,
pp. 318, 15s.

The present Handbook succeeds the Year Book of the Rhododendron Association, which has now become the Rhododendron Group of the Royal Horticultural Society. The Handbook makes available to the general public for the first time the lists of species, etc., formerly published in the Association's Year Book and consists exclusively of annotated lists. It begins with an alphabetical description of all known rhododendron species, including translation of specific name, month of flowering and degree of hardiness and ornamental value, no mean feat considering that there are over 750 so dealt with. There follow a list of synonyms, a list of rhododendrons arranged according to their series and sub-series, a list, with their serial numbers, of all the rhododendrons in present cultivation brought back by the many expeditions, from Forrest's first in 1910 to Kingdon Ward's last in 1939. There is also an annotated list of hybrids. The hardy azaleas are not forgotten and are dealt with in two lists, one comprising all the deciduous forms and the other the evergreen. Here no attempt is made at correct botanical nomenclature but the general trade name is quoted. The last 80 pages or so form the rhododendron stud book and give particulars of all primary crosses between species and of any cross of which one parent is a species. The Handbook is to be revised at 5-year intervals. Obviously no serious grower can afford to be without it.

2772. SEABROOK, W. P. 634.1/7
Modern fruit growing.
Ernest Benn, London, 8th edition, 1947, pp. 313,
71 figs., 10s.

This edition is substantially the same as the sixth (H.A., 15: 920) and the seventh edition (H.A., 16: 545) but bears further signs of piecemeal touching up in an effort to keep pace with modern developments. Thus, while those who possess a copy of one of the earlier editions would be wise to follow the author's advice to scrap it and buy this new edition, those with any of the later editions could quickly bring theirs up-to-date with this eighth edition by means of marginal notes here and there. The time is, however, ripe for a completely rewritten "Seabrook" based on scientific knowledge and modern practice; there is still no other book that covers, so comprehensively, all aspects of commercial fruit growing.

H.B.S.M.

2773. STEER, W. H. 634/635
Laurie's gardening encyclopaedia.
T. Werner Laurie Ltd., London, 2nd imp., 1947,
pp. 278, numerous illustrations, 6s.

This book, first published in 1943, contains much of practical value to the amateur gardener. Its alphabetical arrangement with cross references makes for easy reference to plants or subjects. It is not a book for the expert.

2774. THOMPSON, M. 634.1/2+635.9
Pruning and planting guide for the amateur gardener.
Garden Publications Ltd., London, 1947, pp.
124, 7s. 6d.

This little book is full of tables useful to the amateur gardener. Thus apple varieties are listed briefly according to season, use, pollination needs and capacity, while shrubs are listed by height, habit, ornamental value and suitability for particular positions. The emphasis is on planting rather than on pruning; methods of pruning many species are described briefly. There is a short glossary of technical terms.

2775. AALSMEER. 635.9(492)
Jaarverslag van de Vereniging de Proeftuin voor de Bloementelers te Aalsmeer over 1945.
(Annual report of the Aalsmeer experiment garden for 1945), 60 pp.

As in the previous year (H.A., 16: 1206) most of this report consists of short articles, by various members on the staff, on the trials with ornamental flowering plants, viz. *Carnation*: the *Phialophora* wilt disease; rooting cuttings with growth promoting substances. *Aster*: wilt disease. *Begonia*: the propagation of large flowering hybrids from leaf sets. *Bouvardia*: maintaining the parent plants. *Chrysanthemum*: variety trials. *Erica*: dusting cuttings with growth substances. *Euphorbia*: a disease distorting the leaves; footrot; tests with potting soils. *Hippeastrum*: selection. *Lily*: *Lilium longiflorum* White Queen. *Rose*: variety trials in steamed and unsteamed soil. *Lilac*: inducing late summer flowering.

2776. AMANI. 633/635(678.2/9)
Report of the East African Agricultural Research Institute, Amani, for the years 1942-1945.
H.M. Stationery Office, London, 1946, pp. 43,
1s. 6d. [received 1947].

The long-range research programme of the Institute was seriously interrupted by the war and replaced by a wartime programme. *Cinchona*. Selection work was undertaken amongst old trees derived from Java seed imported many years ago. The Russian, or short-term, method of growing *cinchona* was investigated in field and laboratory, but the results were unpromising, the yield of alkaloids from 12- and 18-months-old plants being excessively low and the totaquina produced below the required standard. Extensive *cinchona* nurseries were laid down with the species *ledgeriana*, *josephiana*, *hybrida* and *succirubra*. The results from vegetative propagation experiments are reported.

Rubber. The possibility of obtaining rubber from succulent *Euphorbia* spp. was investigated, but the low percentage of rubber and the high percentage of resin present in the latex of all the species examined rendered them useless. The investigations arising out of the wartime exploitation of *Ceara*, *Funtumia*, *Landolphia* and other rubber-yielding plants are reported upon.

Camphor from Cinnamomum camphora. Following laboratory and pilot-plant experiments a factory was built to produce camphor for the Ministry of Supply (E. Afr. agric. J., 11: 148).

Potatoes. A physiological study was undertaken into the effect of fertilizers and climate on the growth and yield of potatoes (*Solanum*) growing at low and medium elevations in the tropics (latitude 5° S.).

Brief reference is made to work on the following: *Agave* spp., *Aleurites* spp., coffee and cloves.

2777. AMANI. 633/635(678.2/9)
Report of the East African Agricultural Research Institute, Amani, for the year 1946.
 H.M. Stationery Office, London, 1947, pp. 16, 6d.

This is the last annual report which will appear, as the Institute is to be absorbed into the new East African Agricultural and Forestry Research Organization. A short note is given on the history of the Institute from its foundation under German administration in 1902.

2778. ARIZONA. 633/635(791)
Fifty-seventh Annual Report of the Arizona Agricultural Experiment Station for the year ending June 30 1946. 1947, pp. 74.

The following items of horticultural interest are taken from this report. *Citrus*. The usual approach to the problem of citrus chlorosis, by way of leaf analysis, having proved unsatisfactory, a seedling method was developed for studying trace elements in soils, using barley and rye seedlings. It was again established that grapefruit grown under declining nitrogen conditions were of higher quality from the standpoint of texture, rind thickness, sweetness, flavour, colour, percentage of juice and vitamin C content than grapefruit grown under high nitrogen conditions. Other citrus investigations were concerned with: nitrogen control in grapefruit orchards; coarse grapefruit associated with inadequate irrigation; oil spray for controlling weeds; alfalfa as a cover-crop in citrus orchards and winter temperature surveys. *Lettuce*. The selection and breeding for strains more resistant to bolting under high temperatures continued. Successful strains already established are Nos. 44, 152 and 615. *Melons*. An Arizona strain of Imperial 45 cantaloupe is praised. *Vegetable seed production*. The following vegetable seed crops have been grown successfully in Arizona on a commercial scale: beetroot, carrot, onion, lettuce, endive, salsify and broccoli. Yield figures are given. The following have not given satisfactory yields of seed: brussels sprouts, cabbage, cauliflower, Swiss chard, spinach, kale, chicory, swede turnip, turnip, radish and kohlrabi.

2779. CAMPDEN. 664.85.036.5 + 664.84.036.5
The Annual Report of the Fruit and Vegetable Preservation Research Station Campden 1946. 1947, pp. 58.

Papers on particular research projects are abstracted separately.* Notes on the work in general show that 6 new varieties of strawberry developed at the Cambridge Horticultural Research Station gave promising canning tests. Tests were also started on the new raspberries raised at East Malling. A report was prepared on trials made to determine the percentage destruction of ascorbic acid at various stages in the preparation and canning of black currant pulp for conversion into sweetened puree and syrup. Tests were made of the effect of spray residues of ferric dimethylthiocarbamate and tetramethylthiuramdisulphide on currants required for canning. Other work is briefly noted on hydrogen swells, fruit gumming in plums, effect of incubation on pH of canned vegetables, maturity of canned peas and disposal of factory effluents.

2780. CEYLON. 633/635(548)
Administrative Report of the Acting Director of Agriculture, Ceylon, for 1945, Pt. IV.—Education, Science and Art (D). 1946, pp. 39, 80 cents.

Experiment and investigation. *Coconuts*: a monthly average of 232,000 *Eulophid* parasites of the coconut caterpillar were bred for liberation in infested areas. *Cactus control*: *Opuntia dillenti* was brought under control in two

districts by the introduction of the mealy-bug, *Dactylopius tomentosus*. *Pyrethrum*: the pyrethrin-content of both sun- and barn-dried flowers continues to be high, viz. 1-3%. Plant selection work was continued. *Cinchona*: investigations in progress included spacing, pruning, harvesting and wind-break trials. Advances were made in the technique of frame-working *Cinchona succirubra* on *C. ledgeriana* and in rooting *C. ledgeriana* cuttings. *Plants*: the attempt to eradicate bunchy-top disease in the Matala district continued. *Temperate vegetables*: seed was produced successfully at two centres, a cabbage selection being highly praised. *Tobacco*: reference is made to manual and rotation experiments and to the economics of cigar, cheroot, chewing and bidi tobaccos. *Stock-scion trials*: results of trials with citrus, mango, avocado, breadfruit and rambutan are briefly summarized.

2781. STINSON, F. A. (DELHI, ONT.). 633.71(713)
Results of experiments 1937-1945 at the Dominion Experimental Substation, Delhi, Ont., 1946. pp. 16.

This substation serves the growers of flue-cured tobacco in Ontario, where 72,500 acres were planted to this crop in 1945. White Mammoth, Yellow Mammoth, Gold Doll and Duquesne have given good returns, but varieties resistant to black root-rot are needed. Seedlings are raised in the greenhouse, as the frost-free period may be only 116 days; they are planted at 24 in. x 40 in., topped when flowers appear, and suckers are removed until the third priming has been taken. The kilns now used for flue-curing are unsatisfactory; they show too great a temperature gradient to permit of uniform drying, and the risk of fire is great.

2782. EAST MALLING. 634.1/7(42)
Annual Report of East Malling Research Station 1946. 1947, pp. 164, 12 plates, 10s.

As in former years this report consists of four parts. I. The Experimental Farm, with particular reference to yields from the various plots, and an outline of the routine spray programme. II. General review of research work, with lists of papers published during the year. This summarizes the work carried out by the various Sections and includes accounts of new lines of work that have been started since the end of the war. III. Research reports: 21 research reports by members of the staff, and the weather report for the year. IV. Bulletins for fruit growers: five short articles illustrating the practical results of certain experimental lines of research. [For papers in Parts III and IV see separate abstracts.]

2783. "ECONOMIC BOTANY." 633/635
Economic Botany.
 New York Botanical Garden, N. York 58, 1947, Vol. 1, No. 1, pp. 118, \$1.50, \$5.00 per vol.

Founded, managed, edited and published by E. H. Fullin of the New York Botanical Garden, the first number of this well-illustrated quarterly contains largely semi-popular articles on the production and use of plants and their products; these articles are authoritative, although references are very few. Notes on utilization, abstracted from many journals, fill any space left on the last page of each article, and in this number there is a technical review of the literature on cell walls and synthetic fibres.

2784. FLORIDA. 633/635(75.9)
Annual Report of Florida Agricultural Experiment Station, for year ending June 30, 1946. pp. 212.

This highly condensed report from Gainesville contains much that is of interest to horticulturists in the sub-tropic. It embraces the reports of several substations and divisions including: horticulture, the sub-tropical and citrus station

* See also H.A., 17: 2324.

and the laboratories dealing with strawberries, watermelons and grapes, potatoes, and vegetable crops.

Horticulture: A wide range of subjects is covered, amongst them the propagation, cultivation and fertilizing of tung trees; the testing and propagation of native and exotic shrubs and ornamentals; cover-crop tests in pecan orchards; cold-storage trials of citrus; the selection and development of vegetables suited to Florida; the fumigation of nursery stock; the dehydration of vegetables and fruits, and the effect of boron on certain fruits and nuts. *Sub-tropical Station:* The principal crops studied were: citrus, avocados, tomatoes, potatoes and vegetables. A hurricane caused a serious set-back in the research programme. *Citrus Station:* The results from plant-breeding, pathological, entomological and nutritional investigations are briefly reported. *Vegetable Crop Laboratory:* Over a dozen projects are mentioned. Following successful tests, dithane-zinc-lime spray was recommended for use against late blight of potatoes and tomatoes.

2785. FRUIT AND VEGETABLE PRODUCTS RESEARCH COMMITTEE, DEPARTMENT OF AGRICULTURE, CANADA. 664.85 + 664.84(71)

Annual Report 1946.

Consists of six reports as noted below:

- (i) KENTVILLE. (HOPE, G. W.)
Annual Report of the Storage and Processing Laboratories of Kentville Experimental Station, 1945-46, pp. 17.

Work is reported on canning plums and storing apples and tomatoes.

- (ii) CENTRAL EXPERIMENTAL FARM, OTTAWA, FRUIT AND VEGETABLE PRODUCTS LABORATORY.
(MACARTHUR, M.)

Report of the Fruit and Vegetable Products Laboratory, Division of Horticulture, 1945 and 1946, pp. 30 and 61.

Work is reported on freezing and varietal adaptability, preparation for freezing, and preparation and freezing of juices, of certain fruits and vegetables. Research on dehydration continues on a reduced scale.

- (iii) SUMMERLAND. (ATKINSON, F. E., STRACHAN, C. C., AND MOYLS, A. W.)

Report of the Fruit and Vegetable Products Laboratory, Dominion Experimental Station, Summerland, 1946, pp. 12.

Most of the work reported deals with canning and freezing of fruit and vegetables, the manufacture of fruit juices, and the effect of storage on the vitamin content of the products.

- (iv) DIVISION OF BACTERIOLOGY AND DAIRY RESEARCH, SCIENCE SERVICE. (JONES, A. H., AND PIERCE, M. E.)

Report of the Division of Bacteriology and Dairy Research for the years 1945-46, pp. 21.

Bacteriological work carried out on behalf of other divisions is reported; fruit, vegetables and sugars were involved.

- (v) DIVISION OF HORTICULTURE, CENTRAL EXPERIMENTAL FARM, OTTAWA. (PHILLIPS, W. R.)
Low Temperature Investigations 1945-46 and 1946-47, pp. 45 and 20.

Freezing rates and frozen pack containers were studied; despite the higher latent heat, fruit in syrup froze more rapidly than fruit packed dry. *Potato storage and ripening.* Green fruit should be stored at 50°-55° F. and transferred to 65°-70° F. for ripening as soon as it begins to colour; the variety Harkness could be stored thus for about 4 weeks with a loss of only 5%. Ethylene treatment proved difficult to control, but it does appear to accelerate the ripening of green fruit and to produce sweeter and more attractively coloured fruit. *Peach shipping.* Wrapping of ripe fruit in six quart, flat baskets reduced bruising; this was further reduced when a complete freight car was packed with baskets on temporary shelves, and held at 60° F. by ice.

Potato storage. Sprouting was inhibited temporarily by the methyl ester of naphthaleneacetic acid, but dormancy had already broken in the tubers used. Low temperature breakdown occurred in the variety Katahdin stored at 32° F., but not in Green Mountain. No sweetness was developed at 39° F.; stored at 36° and 32° F. Green Mountain tasted sweeter than Katahdin, and the juice gave correspondingly higher refractometer readings. *Apple storage.* McIntosh and Spy apples from the principal apple growing areas of Canada were stored at 32° F. at Ottawa. Organoleptic tests showed considerable differences in flavour due to source and to maturity at harvest. Commercial cold stores in Nova Scotia were surveyed; the report stresses the disadvantages of converting buildings for cold storage.

- (vi) SUMMERLAND. (BRITTON, J. E., AND FISHER, D. V.)

Report of the Cold Storage Laboratory, Dominion Experimental Station, Summerland, 1945-46, pp. 11.

Recommendations are made for the proper harvesting of eight varieties of apricot. Investigations of black-end in pears showed that the proportion of affected pears reaching the packing station could be reduced by culling while harvesting, particularly with Bartlett. Most of the affected pears are borne on the inner branches of the tree. Although the trouble can apparently be overcome by inarching *Pyrus communis* seedlings into trunks worked on oriental or Kieffer stocks, this method is not considered practicable for growers.

2786. GEORGIA. 634/635(758)

Fifty-eighth Annual Report of Georgia Experiment Station, 1945/46, pp. 131.

The horticultural section of this report contains brief summaries of work on: the influence of tree-size at planting upon growth and production of peaches; the toxicity of some minor elements to young peach trees; the breeding of muscadine grapes, squash, and peppers (pimiento); grape pruning; variety trials with dewberries, blackberries and English peas.

2787. HAWAII. 63(969)

Biennial report of the Hawaii Agricultural Experiment Station for 1944-1946, 1947, pp. 157.

Tomato: With the introduction of the new variety Pearl Harbour and improved methods of disease and insect control, the tomato has become the leading vegetable crop in Hawaii. The attempts to develop a tomato resistant to grey leaf-spot (*Stemphylium solani*), a serious leaf disease, were continued. Work also continued on the development of one resistant to root-knot nematode. Several possible sources of resistance in the tomato to tobacco and cucumber mosaic viruses were investigated. Commercial control of all important tomato insects was secured by using DDT. *Cucurbits:* Because these do not tolerate DDT in concentrations necessary for controlling the melon-fly, a method of using maize as a trap-crop was devised. The maize, which attracts the fly but is not a host, was grown as a barrier and treated with DDT so that a marketable crop of cucumbers was produced within the barrier. *Lettuce:* Progress was made in developing new heat-resistant varieties from the cross Great Lakes × Manoa. *Potatoes:* Of 125 varieties and seedlings imported for trial, 30 showed resistance, or tolerance, to early and/or late blight, the most promising being B70-5. This seedling exhibited greater resistance to late blight than any named variety in Hawaii but is very susceptible to early blight. A segregate from the cross Mohawk × 96-56 has shown resistance to both early and late blight. *New vegetable varieties:* The most promising recent introductions are given as: bush green bean, Logan; eggplant, Badger State; bush lima bean, Early Market and Fordhook 242; beet, Tall Top Early Wonder; okra, Evergreen; broccoli, Texas 107. *Macadamia nut:* 20

selections out of 20,000 have been retained for further trial. Processing tests showed that these selections were 36 to 75% more valuable than local commercial nuts. *Papaya*: Ring-spot, a virus disease, has been shown to be transmitted by the green peach aphid, *Myzus persicae*. Selection amongst inbred and hybrid lines of papaya and the study of carpelloid continued. *Avocado and mango*: The selection, classification and description of these continued, a task which has assumed new importance because many varieties which were considered resistant, or almost immune, to infestations by the Mediterranean fruit-fly (*Ceratitis capitata*) and the melon fly (*Dacus cucurbitae*) are highly susceptible to attacks by the recently discovered Java mango-fly (*D. dorsalis*). *Quick freezing of tropical fruits*: The mango, papaya, litchi, longan, guava and Surinam cherry have been found suitable for this treatment, thus making it possible to send tropical fruits to distant markets. *Orchids*: Considerable work was done on asexual propagation, using various chemical growth-promoting substances.

2788. ILLINOIS STATE HORTICULTURAL SOCIETY.

634.1/8(773)

Transactions of the Illinois State Horticultural Society for 1945, being Vol. 79, 1946, pp. 392.

Most of the many papers published in this volume are of local interest. Abstracts from those of more general interest appear elsewhere [1960, 2195, 2207 and 2208].

2789. "INDIAN FARMING."

634.441+634.3+634.651+635.1/7

Developing village India.

Special number of *Indian Farming*, 1946, pp. 291.

In this beautifully illustrated volume on important features of village life in India the following articles are of particular interest to horticulturists:

SEN, P. K.

Village orchards: mango, pp. 206-9.

BAJWA, B. S.

Village orchards: citrus, pp. 210-14.

NAIK, K. C.

Village orchards: papaya, pp. 215-18, bibl. 5.

PUREWAL, S. S.

Vegetable culture, pp. 219-24.

2790. INDIANA.

635.64+634.25

58th Annual Report Purdue Agricultural Experiment Station for the year ending June 30th, 1945, Lafayette, Ind., 1945, pp. 101 [received 1947].

This report contains brief summaries of progress made in various investigations, and much of the material has now been published elsewhere. Much attention has been given to the tomato; tomatoes rich in beta-carotene and vitamin C have been produced, although they are not so large as the present commercial strains. Peaches generally responded well to mulching, and the cost of this treatment is largely offset by the enhanced value of fallen fruit, which is usually damaged on bare soil.

2791. IOWA.

633/635(777)

Report on Agricultural Research of the Iowa Agricultural Experiment Station for the year ending June 30, 1946, Part I, 1946, pp. 336.

Of the many projects here reported, several are of interest to the horticulturist. In hill culture studies it appears that, with the varieties grown, walnuts are more susceptible than grapes to frost damage at the top of the slope, but at the bottom they escape because they there develop later than do grapes. Anise hyssop (*Lophanthus anisatus*) shows promise as a bee plant and as a source of methyl clavicol. Good crops of fruit were set by Jonathan, Golden Delicious, Joan, Edgewood, Erickson and Delicious apples with Clark's Dwarf as intermediate; there is a big demand for propagating wood of this dwarfing stock. In the breeding programme for improved peaches, the hybrids *Prunus davidiana* × peach

are hardy; their seed is viable, producing vigorous seedling compatible as stocks with peaches and plums. The Yellow Globe synthetic hybrid onion was practically free from neck rot, and produced a greater yield of first-grade onion than did two commercial strains tested with it; only one or two generations were inbred.

2792. "DE LANGE OSSEKAMPEN".

634.1/7(492)-1.8

Jaarverslag van de werkzaamheden in het jaar 1943. Centrale Bemestingsproefveld voor de Fruitteelt "De Lange Ossekampen". (A.R. Lange Ossekampen orchard manurial trials in 1943.) 151 pp. [received 1947].

The lay-out of the central manurial plots is described by the Director, A. M. Sprenger, and the data, set out in 10 tables, illustrate various aspects of the trials, e.g. canker infection, leaf scorch, the quality of the fruit, and yield in relation to manuring. An appendix (pp. 99-151) by J. Ph. Laman Trip gives a detailed account, with 33 tables of the soil of the trial field.

2793. LONG ASHTON.

634/635(42)

Annual Report of the Agricultural and Horticultural Research Station, Long Ashton 1946, 1947, 184 pp.

After an introduction by the Director outlining the changes of staff (with particular reference to the National Agricultural Advisory Service) and the general research activities, the report consists of articles by various members of the staff on fruit and vegetable culture, plant pathology, fruit and vegetable products, advisory and educational work and closes with a list of 29 papers published during 1946. The articles are separately abstracted.

2794. MADRAS DEPARTMENT OF AGRICULTURE.

634.1/8(548)

Reports on work of Agricultural Stations, Department of Agriculture, Madras 1944-45, pp. 486 [received 1947].

Contains reports from 32 stations, including the 4 fruit stations at Coonoor, Burliar, Kallar and Kodur. *Coonoor*: Apples: amongst promising varieties, Irish Peach gave the best average yield in trials, 52 lb. per tree. A list of recently introduced varieties and of successful buddings on crab stock is given. Observations on Malling I, II and XIII Merton 778, 779, 789 and 793 and crab stocks were continued. Mallings stocks are reported not to have done well in layer and stool beds, mainly because of woolly aphid attacks. Crab stocks did well in both tests. Merton stocks remained free from woolly aphids. Nos. 789 and 793 did well in both layer and stool beds while Nos. 778 and 779 seemed to prefer layering. The results from grafting pruning, thinning and training trials are recorded. Plums: pears, peach and persimmon: notes are given on nursery and orchard investigations and variety performance. Brief mention is made of other fruits grown.

Burliar. Reference is made to a successful graft of cheri moyer on bull's heart and to the propagation of mango, steen, jak, litchi and durian by budding and/or grafting. *Kallar*. Mangosteen propagation: the following species were established for trial as rootstocks: *Garcinia cambogia* G. tinctoria, *G. mangostana*, *G. indica*, *G. morella* and *Calophyllum inophyllum*. *G. mangostana* continued to be the most promising stock. Reference is made to propagation work with the following: litchi, soursoop, custard-apple, avocado, star-apple, rose-apple and sapota.

Kodur. Citrus: the results of tests of citrus rootstocks for Sathudi orange and acid lime are tabulated. Two new citrus stocks were also used, *Atalantia monophylla* and *Feronia elephantum*. The last named showed promise. The yields of promising varieties in the citrus collection are given with remarks on each variety. Mango: tables are given showing the results of propagation methods in relation to tree performance. The results from trials of rootstock

of different ages, polyembryonic rootstocks and double working are analysed. A list of the best and most regular performers in the variety collection and of those which bear out-of-season crops is given. Brief reference is made to different varieties of the following: grape-vine, guava, sapota, fig, pomegranate, oustard apple, rose-apple, loquat and mulberry.

2795. MINISTRY OF AGRICULTURE. 634/5
Growing food for health and profit.
H.M. Stationery Office, London, 1947, pp. 68,
1s.

This well indexed guide to vegetable and fruit gardening, illustrated by clear diagrams, will be of great value to the beginner seeking guidance in running a small garden or allotment, and it will doubtless benefit the man who already knows his onions. An introduction, dealing with the economic and aesthetic aspects of growing at least some of one's food, is followed by a nicely balanced chapter on manures, refreshingly uncontroversial; rotations (and there are plans for 5 and 10 rod allotments), pests and weeds complete the general section. The greater part of the book tells the reader what to do and when to do it, month by month; although asparagus is not mentioned, artichokes and kohlrabi are, and the section on apples warns the small planter to choose self-fertile varieties and gives guidance on rootstocks. This reviewer has already invested in a copy.

2796. MINISTRY OF AGRICULTURE. 63: 378(410)
*Report of the Committee on higher agricultural
education in England and Wales.*
Cmd H.M. Stationery Office 6728, London,
1946, pp. 86, 1s. 3d.

The Loveday Committee has covered a very wide field in preparing this report; the gist of their recommendations is that the National Diploma courses should be superseded by Degree Courses. The background of pure science should be given in two years (or one, if the student has reached Intermediate level at school), and a further two years should be devoted to agricultural or horticultural study; it is suggested that the year of practical experience might count for national service. This general raising of the level of teaching is particularly necessary in horticulture, and the committee notes that few holders of the Diploma take commercial employment, and few growers are prepared to give their sons such university training as is at present available. For the advisory services an Honours Degree in pure science, followed by a graduate course in some particular branch of horticulture, is the training recommended. The committee estimate that 250 students should be recruited annually to horticulture; 100 could be taken at Reading and the balance at Wye and the Midland Agricultural College—it is thought preferable to raise the standards at these two colleges rather than develop new schools elsewhere.

2797. MINISTRY OF EDUCATION AND MINISTRY OF
AGRICULTURE. 371.2/3: 633+634+635
*Interim report on agricultural and horticultural
institutes.*
H.M. Stationery Office, London, 1947, pp. 50,
1s.

The Loveday Committee recommend an interim programme, limited by shortage of teaching staff, which aims at providing a one-year course for one-tenth of the annual intake into the industries; pupils should enter at the age of 18 after a preliminary year of practical experience. Horticultural Institutes should have a capacity of 40 to 100 pupils, and new institutes should be established as soon as may be in the Spalding-Wisbech area with a bias toward growing fruit and ornamentals, near Evesham for fruit and vegetables, and near Blackpool for cropping under glass. An appendix suggests suitable syllabuses for general training,

and for more detailed alternative studies of fruit farming, vegetable production, cropping under glass, and growing ornamentals.

2798. NEW YORK STATE. 633/635(74/7)
*65th Annual Report New York State Agricultural
Experiment Station for the year ended
June 30, 1946, Geneva, N.Y., 1947, pp. 73.*

The Divisions of Bacteriology and Chemistry have been combined in a new Division of Food Science and Technology. Most of the work of this Division concerns food, but flower bud induction is also being studied. *Entomology and Plant Pathology.* These Divisions contribute summaries of studies on the value of the newer insecticides and fungicides. Sodium dimethylthiocarbamate was shown to enter apple leaves through the laminated lower cuticle, so that internal therapy may be possible. Many strains of hops were tested for resistance to downy mildew and aphids; Brewers Gold has been the most promising parent. *Pomology.* Several varieties recently introduced to growers in the Hudson River Valley show promise: these include Milton, Lodi, Cortland and Macoun apples. In the project to secure a seed supply of peach rootstocks for the nursery trade, the best stands were obtained by planting pits soon after harvest; seeds may be protected from fungus attack by dusting with Spergon. *Vegetable crops.* Peas responded profitably to the application of nitrogenous fertilizers, even when the roots were partially destroyed by root rot.

2799. NEW YORK STATE HORTICULTURAL SOCIETY. 634(747)
*Proceedings of the 92nd Annual Meeting
New York State Horticultural Society, 1947,
pp. 345.*

Most of the papers presented at these meetings dealt with the control of the pests and diseases of apples and other fruits, and spraying schedules are provided by experts at Geneva and Ithaca, covering apple, pear, cherry, peach, plum and prune, quince and grape (pp. 292-318). Other papers deal with spraying and dusting, blossom thinning, packing apples, the Weather Bureau service, and the danger to bees of early sprays; in parts of New York State intensive fruit culture has so altered conditions as to reduce the population of pollinating insects, and bees introduced at blossom time are frequently killed by arsenical sprays.

2800. QUEBEC POMOLOGICAL AND FRUIT GROWING
SOCIETY. 634.1/8(71.4)
*Annual Report of the Pomological and Fruit
Growing Society of the Province of Quebec for
1944 and ditto for 1945, pp. 47 and 57 [received
1947].*

These reports contain papers read at the annual winter meetings of the society, which is devoted to the advancement of fruit culture, forestry, and horticulture generally, though the apple is the major interest. *Cold storage* (1944-1945): speakers described cold stores for apples in British Columbia and New England, and the desirability of pre-cooling fruit before storage was emphasized. *Varieties* (1944): McIntosh, Cortland, Lobo, Atlas and Joyce are recommended for new plantings in Quebec; there are descriptions of a score of new varieties now being tested, some of which originated in the United States. Frost damage, weather forecasting, and the newer fungicides are discussed (1945). *Spraying:* papers were presented on the Speed Sprayer (1944).

2801. QUEBEC POMOLOGICAL AND FRUIT GROWING
SOCIETY. 634.1/8(71.4)
*Annual Report of the Pomological and Fruit
Growing Society of the Province of Quebec for
1946.*

Abstracts from this report appear elsewhere in this number.

2802. DEPARTMENT OF AGRICULTURE FOR SCOTLAND.

63(411)

Scottish Agriculture, Vol. 26, No. 1, July 1946.
Edinburgh, H.M. Stationery Office, pp. 64,
1s. per number, 4s. 6d. post free per volume.

The Department of Agriculture for Scotland has resumed the publication of its quarterly journal—abandoned during the war—with a new attractive cover and a slight alteration of title. The journal will have a scientific bias, but will be "as readable and practical as possible".

2803. TEXAS.

631.544 + 634.8(764)

88th Annual Report of Texas Agricultural Experiment Station 1945, 1946, pp. 76.

This report presents only a section of work in progress. Horticulturists will be interested in the outdoor hot beds for raising tomato seedlings. The soil in these is heated either by stove pipe flues or by electric heating cable, the air by flues or by electric lamps, and the beds are covered by sheets when the temperature falls below 38° F., and by metal when rain is heavy. The Kniffen method of pruning grapes continues to be the most profitable.

2804. TRELAWNEY.

633.71(689.1)

Annual Report Trelawney Tobacco Research Station for 1946, being *Publ. Tobacco Research Board, S. Rhodesia*, 10, 1947, pp. 59.

Agronomy. The investigations reported were a continuation of those of previous years, including tests of methods of applying compost and fertilizers; rotation trials; spacing and topping experiments; and tests of fertilizers in combination with each other and with compost. *Breeding and selection.* Breeding for yield and quality continued. *Combined cultural and varietal trials.* Experiments were continued, in a modified form, to test 3 varieties (i) in combination with three levels of N, P and K, (ii) with 3 levels of compost and N, and (iii) with 4 spacing distances and 2 heights of topping. *Root-knot nematode.* Investigations comparing eelworm infestation of tobacco following two rotation systems are reported. *Soil insect pests.* Methods for controlling white grubs by chemicals and cultural methods were investigated. *Furnace tests.* These embraced fuel consumption tests with coal-burning furnaces, efficiency trials of tobacco flue pipes, and tests of oil-burning equipment.

[An introductory review summarizing the numerous investigations recorded in this report would be of great assistance to readers.]

2805. TURRIALBA.

63(072): 551.566.1(728.6)

Annual Reports of the Inter-American Institute of Agricultural Sciences for the years 1944-45 and 1945-46, pp. 36 and 68 [received 1947].

The institute, which was founded in October 1942, was supported in 1946 by 15 American Republics. Its main purpose is to encourage and advance the development of the agricultural sciences in the American Republics through research, teaching and extension services. Its principal field headquarters is at Turrialba, 2,000 ft. a.s.l., in Costa Rica. There is a substation at Gatún, 100 ft. a.s.l., in Panama. The following abstracts are from sections of the reports concerned with horticultural and plantation crops. *Tropical grapes:* In the past grape cultivation has not been a success in damp, tropical regions for the reason that the varieties tried have come from temperate climates. Breeding work in progress at Turrialba aims at breeding distinct new types of tropical vines, developed for the most part from wild tropical and sub-tropical American grapes. The tropical species most used in the breeding programme have

been *Vitis shuttleworthii*, *V. tiliaefolia* and *V. gigas*. Ce selections show great promise for tropical regions, but equal to many of the better North American cultivar varieties in yield, quality, appearance and size.

Blackberries: Some valuable new varieties for the tropics are expected from the breeding work. Hybrids betw *Rubus trichomallus* of Central America and the Youngb of North America are being made, and also between sev wild species and some carefully chosen temperate type *Guava:* Eight species of *Psidium* are mentioned in connection with the programme for improving this fruit.

Tomatoes: Attempts are being made to breed varieties suited to the tropics.

Squash: Improved types of *Cucurbita moschata* have been bred to replace varieties of *C. pepo* and *C. maxima*, which do not succeed, mainly because of stem-borers and diseases.

Rubber: Mention is made in the 1944-45 report of roots studies and of clonal selection, top-budding and tap trials with hevea.

2806. U.S. DEPARTMENT OF AGRICULTURE. 016: 63

Bibliography of Agriculture,* Vol. 10, No. 6, June 1947.

U.S. Department of Agriculture Library.

This includes the subject and author index of Vol. 10 which contains over 35,000 items.

2807. WASHINGTON STATE HORTICULTURAL ASSOCIATION. 634/635(797)

Proceedings of the 42nd Annual Meeting of the Washington State Horticultural Association, 1946, pp. 325.

At this meeting speakers rather emphasized the disadvantages of using DDT in orchards, particularly where it is prevalent. The use of Elgetol (the sodium salt of dinitro-cresol) is now generally recommended for judicious use in thinning apple blossoms to minimize biennial bearing. This chemical is also being tested on pears and cherries. Bees were as good for pollinating as were aircraft bombs, but the newer insecticides must not be used indiscriminately at blossom time. The papers on sprayer irrigation include one dealing with engineering design of some length. Pear psylla: Fresh infestations are numerous in Washington, where outbreaks have sprayed regularly with nicotine; but the pest is largely uncontrolled in British Columbia.

2808. The following also have been examined:

a A.R. Dep. Sci. Agric. Barbados, 1945-46, pp. 19.

b NATIONAL RESEARCH COUNCIL, CANADA. *Thirtieth Annual Report of N.R.C. Canada for 1946-47*, N.R.C. No. 1519, 1947, pp. English 28, French 30.

c 15th A.R. Éire Minist. Agric., 1945-46, pp. 159 + 84, 3s. 6d.

d *Progress Report of Inst. of Plant Industry, Indore, for year ending 31 May, 1946.*

e *Combined Proceedings of 22nd National Shade Tree Conf., 13th Western Shade Tree Conf. and 7th Southern Shade Tree Conf., Ohio, 1946*, pp. 322.

* Obtainable from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. \$4.50 a year.

